Draft Environmental Assessment

Edwin B. Forsythe National Wildlife Refuge
Cedar Bonnet Island Management Unit

Habitat Restoration and Management Plan

To Compensate for NJDEP Regulated Impacts
Associated with the

NJDOT Route 72 Manahawkin Bay Bridges Project

Township of Stafford
Ocean County, NJ

June 2014

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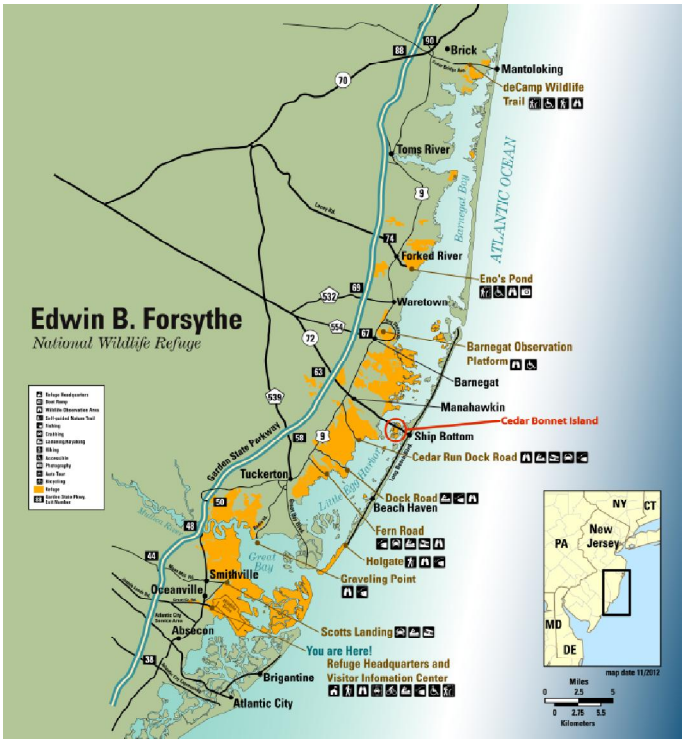
Figures

Tables

Appendices

1. INTRODUCTION

Cedar Bonnet Island (CBI) is located within the Township of Stafford, Ocean County, New Jersey and is bisected by New Jersey Route 72 (Route 72), which connects the mainland to Long Beach Island (LBI) via the Manahawkin Bay Bridges (Figure 1). The northern portion of the island is comprised of residential houses, a marina, a restaurant, and coastal marsh. The southern portion of the island is comprised of coastal marsh, freshwater wetlands, late successional fields, and maritime upland forest. Portions of land to the north and south of Route 72 comprise the Cedar Bonnet Island Unit (CBI Unit) of the Edwin B. Forsythe National Wildlife Refuge (Refuge), which is owned and managed by the United States Fish and Wildlife Service (Service). The New Jersey Department of Transportation (NJDOT) has proposed to mitigate for intertidal/subtidal shallows and riparian zone impacts caused by the NJDOT Route 72 Manahawkin Bay Bridges Project on the portion of the CBI Unit that is south of the Route 72 right-of-way (ROW). The proposed mitigation activities being proposed on the CBI unit, herein after the Habitat Restoration and Management Plan, is the subject of this Environmental Assessment (EA). The proposed site is a former dredged material disposal facility dating back to the 1950's. The Service and the Trust for Public Lands finalized purchase of the property in 1992 and integrated it into the Refuge. Currently, the site consists of degraded wetland habitats dominated by common reed (*Phragmites australis*) and degraded maritime upland habitats dominated by poison ivy (*Toxicodendron radicans*).



Edwin B. Forsythe National Wildlife Refuge

2. BACKGROUND

Route 72 crosses the Manahawkin Bay, which is part of the larger Barnegat Bay estuary complex. This complex was recognized in 1995 for its importance by being designated a National Estuary. Route 72 also provides access to a portion of the Refuge's CBI Unit. The Refuge was recognized as a "Wetland of International Significance" at the Ramsar Convention in 1986. Route 72 also forms the northern boundary of the Jacques Cousteau National Estuarine Research Reserve. The Ocean County Natural Lands Trust, with the assistance of the Trust for Public Lands, preserved undeveloped land along the Route 72 approach to the bay to ensure that visitors to LBI had a "Green Gateway" to Barnegat Bay.

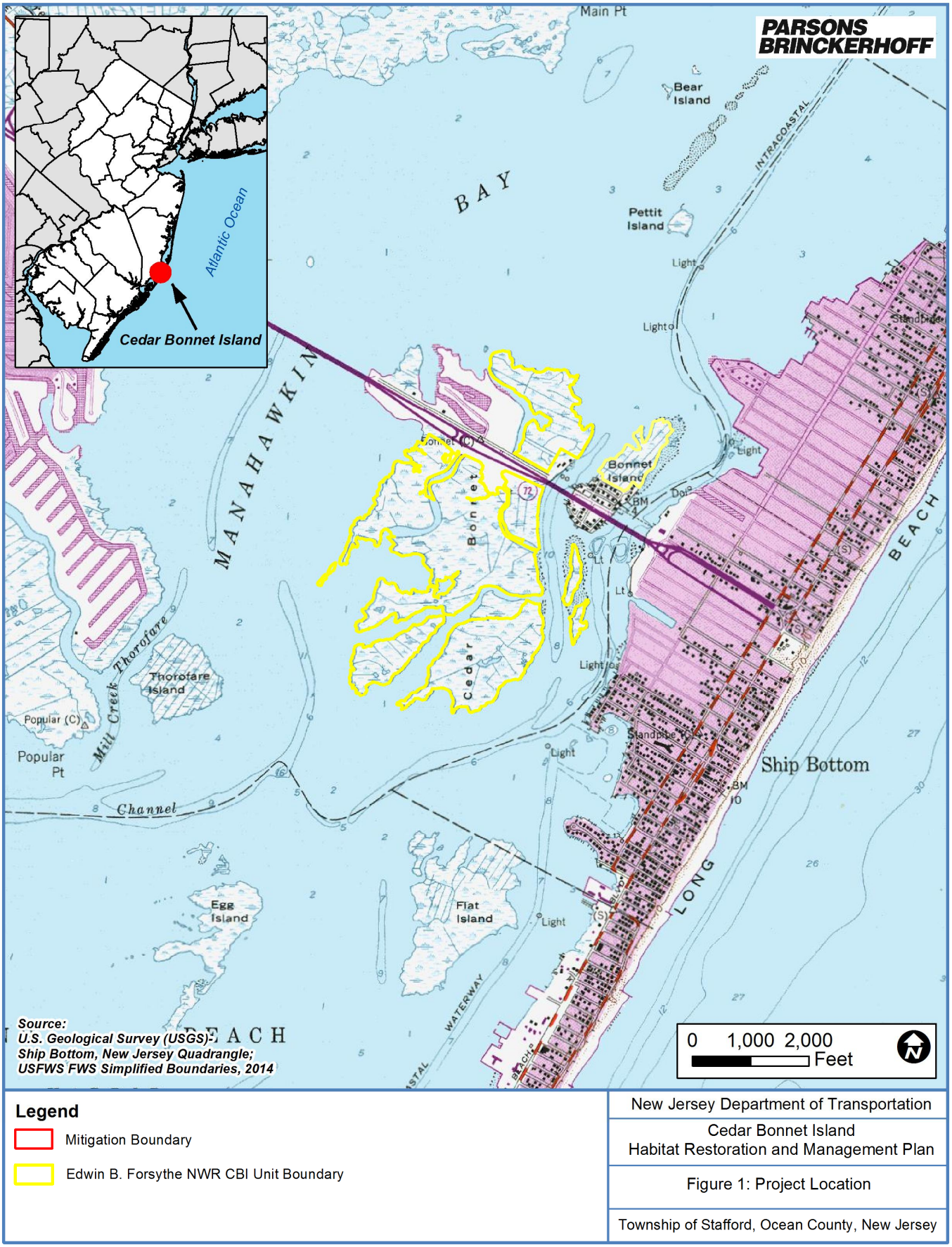


FIGURE 1: PROJECT LOCATION

CBI is one of several bay islands that are found in the middle of Manahawkin Bay. CBI is the largest island of the group. More than 50 years ago, the owner of the island created a large dredge disposal facility on the southern portion of the island with the intent of converting it into a housing development. Material from the Intracoastal Waterway, West Thorofare and the marina north of Route 72 was placed in the facility.

In the 1980's, the Service purchased the northern portion of the CBI Unit north of Route 72. The Service and the Trust for Public Lands finalized purchase of the remaining southern property south of Route 72 (133 acres) in 1992 and integrated it into the Refuge. Currently, waterfowl hunting on the small islands at the southern end of the CBI Unit is permitted, but no other public access is available.

In 2003, the USACE and NJDEP partnered on an expansive study for the restoration of the Barnegat Bay watershed (USACE, 2003). Restoration of the CBI Unit was among the top priorities identified in the entire watershed. The restoration and expanded public use of the CBI Unit is included in the Refuge's Comprehensive Conservation Plan (CCP) (U.S. Fish and Wildlife Service, 2004). Restoration of the island is also supported by the Barnegat Bay Partnership, a consortium of environmental groups and resource agencies dedicated to the conservation of Barnegat Bay. As part of implementing restoration activities within the CBI Unit in accordance with the CCP, in 2008 and 2009 the Service initiated attempts to control the invasive common reed on the site by applying herbicides by air.

On September 16, 2011, the Federal Highway Administration (FHWA) issued a Finding of No Significant Impact (FONSI) for the NJDOT Route 72 Manahawkin Bay Bridges Project as part of its review in accordance with the National Environmental Policy Act (NEPA). The NJDEP permit approval (NJDEP Permit Number 1500-10-0002.1) and the USACE permit approval (CENAP-OP-R-2012-328-35) for the NJDOT Route 72 Manahawkin Bay Bridges Project were issued on October 12, 2012 and January 17, 2013, respectively. To address permit conditions, the NJDOT has proposed to consolidate mitigation for intertidal/subtidal shallows and riparian zone impacts caused by the NJDOT Route 72 Manahawkin Bay Bridges Project through habitat restoration and management of the Refuge's CBI Unit.

3. PROJECT DESCRIPTION

The NJDOT is proposing to restore and enhance 41 acres located within the southeastern portion of the CBI Unit, the purpose of which is to mitigate for impacts to intertidal/subtidal shallows and riparian zones associated with the implementation of the NJDOT Route 72 Manahawkin Bay Bridges Project (Figure 2). No mitigation for Clean Water Act Section 404 impacts of the project are to be mitigated on federal land, as per Service policy (501 FW 2).

The NJDEP Permit for the NJDOT Route 72 Manahawkin Bay Bridges Project requires mitigation that returns equal or greater function and value of the natural resources than those which will be disturbed. NJDOT's proposed mitigation plan will include the enhancement of common reed freshwater wetlands to smooth cordgrass (*Spartina alterniflora*) low marsh, saltmeadow cordgrass (*Spartina patens*) and saltgrass (*Distichlis spicata*) high marsh, and non-vegetated

FIGURE 2: HABITAT RESTORATION AND MANAGEMENT AREA

intertidal/subtidal shallows (in the form of tidal channels) to compensate for the loss of intertidal/subtidal shallows due to the aforementioned roadway improvements. In addition, this proposed mitigation project will reforest existing, low quality upland riparian habitat to compensate for the loss of riparian zone that will also be disturbed by the roadway improvements. Furthermore, this mitigation plan will also include public access improvements to accommodate passive recreation at the site.

The goal of the proposed intertidal/subtidal shallows mitigation is to restore 20 acres of intertidal/subtidal shallows (i.e. low marsh and high marsh) by excavating dredge spoils located on the southern portion of the island to an elevation that will be flooded by the tide on a twice daily basis. As shown on the Cedar Bonnet Island Mitigation Site Plan (Figure 3) this restoration will include the following components:

- The creation of 7.84 acres of a smooth cordgrass low marsh presently dominated by common reed and poison ivy;
- The creation of 10.78 acres of saltmeadow cordgrass and saltgrass high marsh presently dominated by common reed and poison ivy;
- The creation of 1.62 acres of non-vegetated intertidal/subtidal shallows in the form of tidal channels to allow the twice daily inundation of the restored saltmarsh;
- Improve the ratio of wetlands to open waters to approximate a more natural meandering condition for tidal wetlands;
- Increase the connectivity and productivity of the marsh within and adjacent to the CBI Unit which will benefit fisheries and wildlife of the overall marsh system; and,
- Create a diverse estuarine wetland system that will be self-sustaining into the foreseeable future.

In addition, the proposed project will revegetate upland portions of the mitigation area within the former dredge disposal area. The plan will encompass the following components:

- Revegetate 5.05 acres of saltmarsh fringe with coastal maritime shrubs to transition from saltmarsh to upland;
- Revegetate 6.10 acres of upland forest to create a coastal maritime forest community;
- Revegetate 1.46 acres of shrub along the mitigation site's northeastern and northwestern perimeters; and,
- Revegetate the remaining 5.41 acres of upland area with meadow habitat by seeding with native, salt tolerant grasses and herbaceous vegetation.

Also, in the southeastern portion of the mitigation site, 5.44 acres is categorized as an upland habitat enhancement area which will receive supplemental plantings of trees and shrubs to augment existing vegetation. This portion of the site currently has numerous eastern red cedar (*Juniperus virginiana*) trees which could be attractive for nesting and/or roosting wading birds, such as black-crowned night-heron (*Nycticorax nycticorax*), in the future. Adjacent to the western portion of this upland habitat enhancement area is 1.40 acres categorized as northern diamondback terrapin (*Malaclemys terrapin*) nesting habitat which will be left undisturbed in its current state to sustain this nesting habitat.

Mitigation Site Summary Table	
Resource	**Area AC.**
Existing Conditions	
Wetlands	18.629
Uplands	26.453
Total	45.082
Proposed Conditions	
Upland Habitat Restoration Area	18.014
Intertidal/Subtidal Shallows	20.234
Upland Habitat Enhancement Area	5.441
Terrapin Nesting Area	1.393
Total	45.082

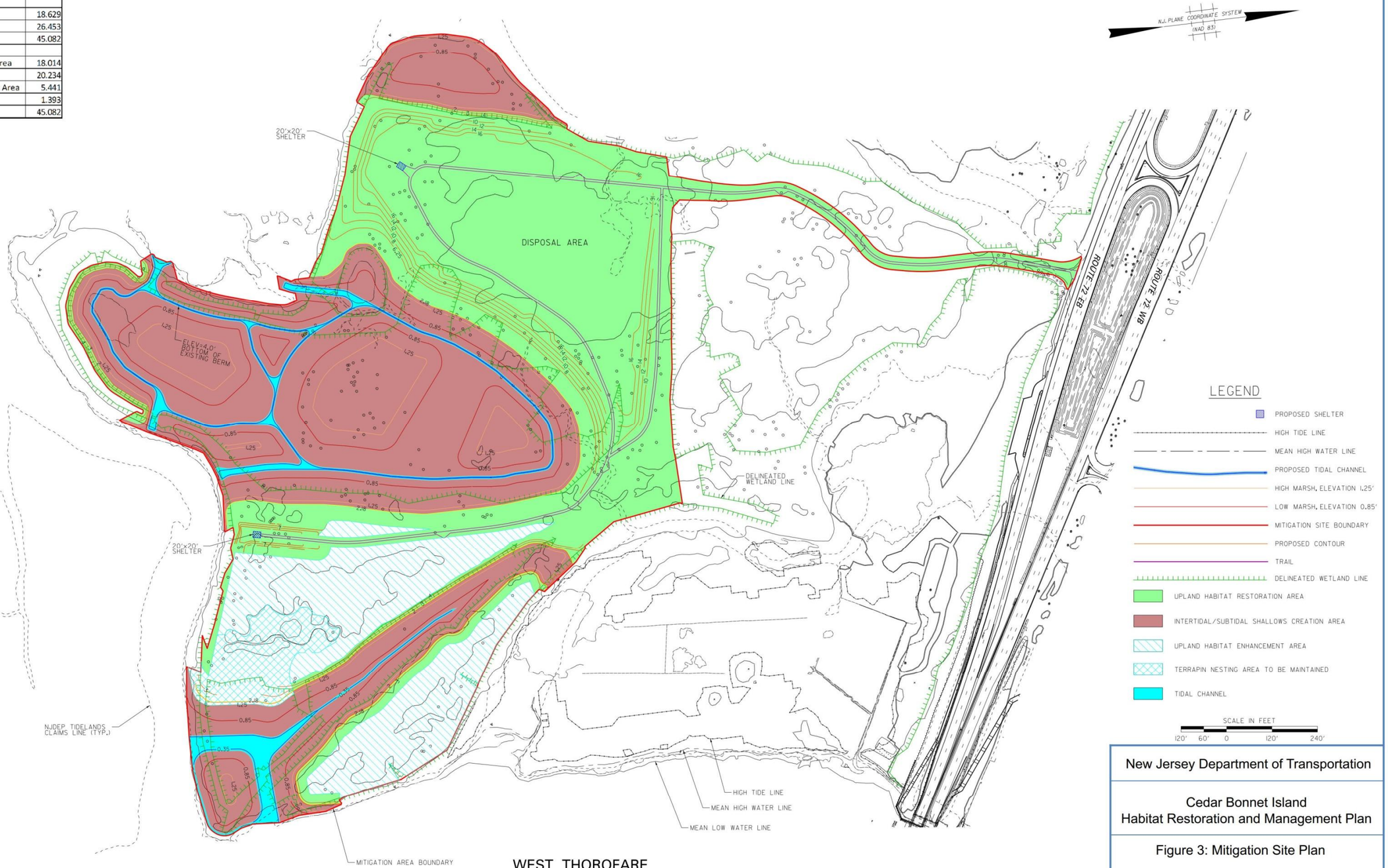


FIGURE 3: MITIGATION SITE PLAN

This proposed mosaic of diverse habitats will be elevation-dependent and will include tidal wetlands consisting of low marsh and high marsh at the lowest elevations dominated by smooth cordgrass and saltmeadow cordgrass, respectively. Moving landward an upland area dominated by coastal shrubs will provide a transition between the coastal wetlands and the upland maritime forest. The upland maritime forest will consist of a variety of tree species to provide feeding and roosting areas for a large variety of birds. These diverse habitats will potentially recruit a diverse population of fauna, as described in the Edwin B. Forsythe National Wildlife Refuge Habitat Management Plan (HMP) (Edwin B. Forsythe NWR, 2013), including: American oystercatcher (*Haematopus palliates*), piping plover (*Charadrius melodus*), ruddy turnstone (*Arenaria interpres*), semipalmated sandpiper (*Calidris pusilla*), American black duck (*Anas rubripes*), American bittern (*Botaurus lentiginosus*), bald eagle (*Haliaeetus leucocephalus*), green heron (*Butorides virescens*), glossy ibis (*Plegadis falcinellus*), least bittern (*Ixobrychus exilis*), brant (*Branta bernicla*), bufflehead (*Bucephala albeola*), clapper rail (*Allus longirostris*), dunlin (*Calidris alpine*), marsh wren (*Cistothorus palustris*), snowy egret (*Egretta thula*), tricolored heron (*Egretta tricolor*), willet (*Ringa semipalmata*), yellow-crowned night-heron (*Nyctanassa violacea*), monarch butterfly (*Danaus plexippus*), and northern diamondback terrapin.

The proposed tidal wetland area will be achieved by excavation of the project area to an elevation of 0.65 feet to 1.90 feet (with mean high water at 0.63 feet), and the creation of a series of channels that will facilitate tidal hydrology twice per day within the restored tidal wetlands. These created channels, designed to mimic natural tidal creeks, will have a maximum depth of 1.0 foot where the top of the channel is at a height of 0.65 feet above sea level and the bottom will be at -0.35 feet below sea level. This tidal inundation will promote the necessary hydrological conditions to allow a saltmarsh to flourish while at the same time reducing the likelihood of common reed reestablishment on the site.

Common reed dominated wetlands provide limited benefit to wildlife. Common reed marshes provide nesting and resting habitat for some bird species, but the diversity in species is low relative to the species that utilize native saltmarsh. The proposed saltmarsh will provide spawning and foraging habitat for aquatic species including mummichog (*Fundulus heteroclitus*), juvenile striped bass (*Morone saxatilis*), blue crab (*Callinectes sapidus*), and other invertebrate species such as bloodworms (*Glycera dibranchiata*), gastropod (*Melampus*), and grass shrimp (*Palaemonetes spp.*). This diversity in available forage species will attract a variety of higher trophic level species including passerine species, wading birds, and shorebirds.

The Habitat Restoration and Management Plan will contribute to these important values through increased habitat diversity by the enhancement and creation of uplands, intertidal/subtidal shallows (i.e. tidal wetlands), and transition areas. Creating and enhancing wildlife habitat, through habitat interspersion and changes in topography, can result in habitat conditions required by specific species during their reproduction and/or migrating activities. Areas that will become seasonally flooded by the proposed tidal channels have the potential to be reproduction sites for fish and habitat for invertebrates to thrive. Changes in topography and the creation of low and high marsh will create mudflat areas for migrating shorebirds and flat open areas for nesting colonial waterbirds. The creation and enhancement of upland areas can create covered thickets and den

sites for over-wintering birds, herptiles and mammals. In addition, the anticipated increase in wildlife and fisheries diversity will be attractive to birders, fishermen, and other naturalists, and the improvement to the aesthetics of the marsh will enhance the overall visitor experience.

The Habitat Restoration and Management Plan will include Americans with Disabilities Act (ADA) compliant accessible trails on the CBI Unit creating access for all visitors. Additionally, a paved parking area and sidewalk are being constructed along Route 72 eastbound which will provide additional access to the entrance of the CBI Unit. The paved parking lot along Route 72 eastbound will have 14 parking spaces. The trails within the Refuge will consist of 6-foot-wide stone dust pathways with a 10-foot-wide grass strip on both sides. A drainage swale will be installed along the trail to allow drainage and prevent erosion of the trail.

In addition to the trails, the plan includes two designated wildlife observation areas. Each observation area will have a 20'x20' covered pavilion, one picnic table that will provide seating, and protection from the sun and rain. The observation areas and trails, along with the proposed interpretive displays discussed herein, will advance the Refuge's CCP Goals and Objectives. Goal 4 of the CCP is to "Provide opportunities for high-quality compatible, wildlife-dependent public use". Objective 9 is to "Expand compatible wildlife observation and photography opportunities on the Refuge" and Objective 11 is to "Expand compatible environmental education and interpretation opportunities both on and off the Refuge". Objective 9 - Strategy B specifically recommends to "construct universally accessible observation platforms with appropriate parking areas at Bonnet Island". This mitigation plan will meet this objective by constructing two observation platforms on Cedar Bonnet Island with parking facilities accommodated as part of the Route 72 Manahawkin Bay Bridges roadway improvement project. Objective 11 - Strategy D specifically recommends to "increase the availability of interpretative opportunities and information in new and existing public use areas". The plan will meet this objective by providing five interpretative signs along the proposed trail within the CBI Unit.

The plan will also advance the Refuge's HMP Goals and Objectives. Goal 1 of the HMP is to "Maintain and restore, where possible, the biological integrity, diversity, and environmental health of Coastal Habitats to sustain native plants and wildlife, federal trust resources, and species of conservation concern". Objective 1.2 – Salt Marsh Habitats is to "Maintain, protect, and restore 33,358 acres of Salt Marsh to provide high quality habitat for American black duck, American oystercatcher, clapper rail, saltmarsh sparrow, snowy egret, willet, Atlantic brant, northern harrier, semipalmated sandpiper and northern diamondback terrapin…". Salt Marsh Management Strategies and Prescriptions as contained within Objective 1.2 includes "Working with partners to restore tidal habitat at the Cedar Bonnet Island Unit…". Goal 3 of the HMP is to "Maintain and restore, where possible, the biological integrity, diversity, and environmental health of Upland Habitat to sustain native plants and wildlife, federal trust resources, and species of conservation concern". Objective 3.1 – Upland Forest Communities is to "Manage, protect, and restore 4,839 acres of Upland Forest Communities…".

4. PURPOSE AND NEED

This Habitat Restoration and Management Plan will advance the Goals and Objectives of the CCP and HMP as follows:

- Create intertidal/subtidal shallows within a former dredge disposal site.
- Improve tidal flushing within existing degraded and poorly functioning wetlands.
- Promote the establishment of a *Spartina spp.* marsh.
- Reduce or eliminate common reed within the existing wetland and upland areas.
- Establish native woody vegetation.
- Enhance upland wildlife habitat value including riparian areas.
- Improve public access for passive recreation.

The Service consented to the use of the CBI Unit as a mitigation site for the NJDOT Route 72 Manahawkin Bay Bridges Project in a letter from Refuge Manager Virginia Rettig dated July 27, 2012 (Appendix A).

5. ALTERNATIVES CONSIDERED

The proposed Habitat Restoration and Management Plan is intended to compensate for permanent losses to intertidal/subtidal shallows and riparian zones attributed to the NJDOT Route 72 Manahawkin Bay Bridges Project. No mitigation for Clean Water Act Section 404 impacts of the project are to be mitigated on federal land, as per Service policy (501 FW 2). The goal of the Habitat Restoration and Management Plan is to improve tidal flushing of a former dredge disposal site through the establishment of high and low marsh, enhance upland coastal habitats through the establishment of woody vegetation, management and control of common reed within the upland and wetland habitats, and improved public access for passive recreation.

The project will enhance up to 20 acres of intertidal/subtidal shallows within the existing dredge disposal area. This will be accomplished by removing a portion of an existing dredge disposal containment berm and excavating existing wetland areas dominated by common reed to an elevation below Spring High Tide (1.60 feet) to increase tidal flushing and establish tidal marsh dominated by smooth cordgrass and saltmeadow cordgrass. To achieve mass balance, excavated material will be deposited on the upland portion of the site and incorporated into the upland restoration component of the project. With the exception of clean topsoil to promote upland vegetation, no material is proposed to be removed from, or brought onto, the site. Proposed riparian upland areas created by the proposed tidal channels will be planted with native woody vegetation which will address riparian zone mitigation requirements. Public use access trails would also be incorporated into the project and would terminate at two observation pavilions: one at the southeastern corner of the site and one at the southwestern corner of the site.

This section describes the alternatives considered for the CBI Unit and the benefits of those alternatives. Based on these analyses, Alternative 3A-High is being proposed as the Preferred Alternative to accomplish the restoration and management activities on the CBI Unit.

The below sections describe the four project alternatives analyzed:

- Alternative 1 – Southeastern Mitigation Project
- Alternative 2 – Southwestern Mitigation Project
- Alternative 3 – Combined Mitigation Project (Southeastern and Southwestern Mitigation Projects
- Alternative 4 – No Action

5.1 Alternative 1 – Southeastern Mitigation Project

Alternative 1 involves restoring approximately 3.07 acres of wetlands (intertidal/subtidal shallows) in the southeastern section of the CBI Unit, as well as restoring approximately 3.27 acres of riparian zone. An open water channel is proposed consisting of approximately 0.27 acres. See Figure 4.

This alternative was removed from further consideration due to its relatively small areas of proposed restoration as compared to Alternative 3. Furthermore, Alternative 1 would not optimize the environmental benefits of the overall habitat restoration program and would not include non-riparian upland restoration, supplemental planting enhancements, or recreational opportunities.

5.2 Alternative 2 – Southwestern Mitigation Project

Alternative 2 involves restoring approximately 5.50 acres of wetlands (intertidal/subtidal shallows) and riparian zone in the southwestern section of the CBI Unit. An open water channel is also proposed consisting of approximately 0.29 acres. See Figure 5.

This alternative was removed from further consideration due to its relatively small areas of proposed restoration as compared to Alternative 3. Furthermore, Alternative 2 would not optimize the environmental benefits of the overall habitat restoration program and would not include non-riparian upland restoration, supplemental planting enhancements, or recreational opportunities..

5.3 Alternative 3 – Combined Mitigation Project (Southeastern and Southwestern Mitigation Projects)

Alternative 3 was initially selected for agency review as this alternative presented the most environmentally beneficial approach regarding restoration size and functionality. Alternative 3 involves restoring 14.26 acres of wetlands (intertidal/subtidal shallows) and the creation of 0.43 acres of tidal wetlands on the CBI Unit, as well as restoring 3.27 acres of riparian zone habitat. An open water channel consisting of 0.85 acres is also proposed. See Figure 6.

During the design process, the proposed created wetland area that would have connected the southeastern and southwestern mitigation areas was removed due to concerns regarding the ability of the tide to extend far enough inland to sustain a wetland area at this location. Construction of a ditch through the adjacent coastal marsh would have been required to obtain water from West Thorofare. Disturbing this natural coastal wetland area to construct the drainage ditch was deemed undesirable to the USACE and NJDOT. As such, all parties agreed to remove this concern by removing the proposed wetland area "connection" as the design progressed.

This alternative was carried through for further analysis and design towards development of the Preferred Alternative. Alternative 3 optimized the environmental benefits of the overall habitat restoration program and because of the larger project area it created the optimal environment for tidal inundation into the project site, as well as maximizing benefits to the coastal marsh habitats and its dependent wildlife. Additionally, development of this alternative would include non-riparian upland restoration, supplemental planting enhancements, and recreational opportunities.

FIGURE 4: ALTERNATIVE 1 - SOUTHEASTERN MITIGATION PROJECT

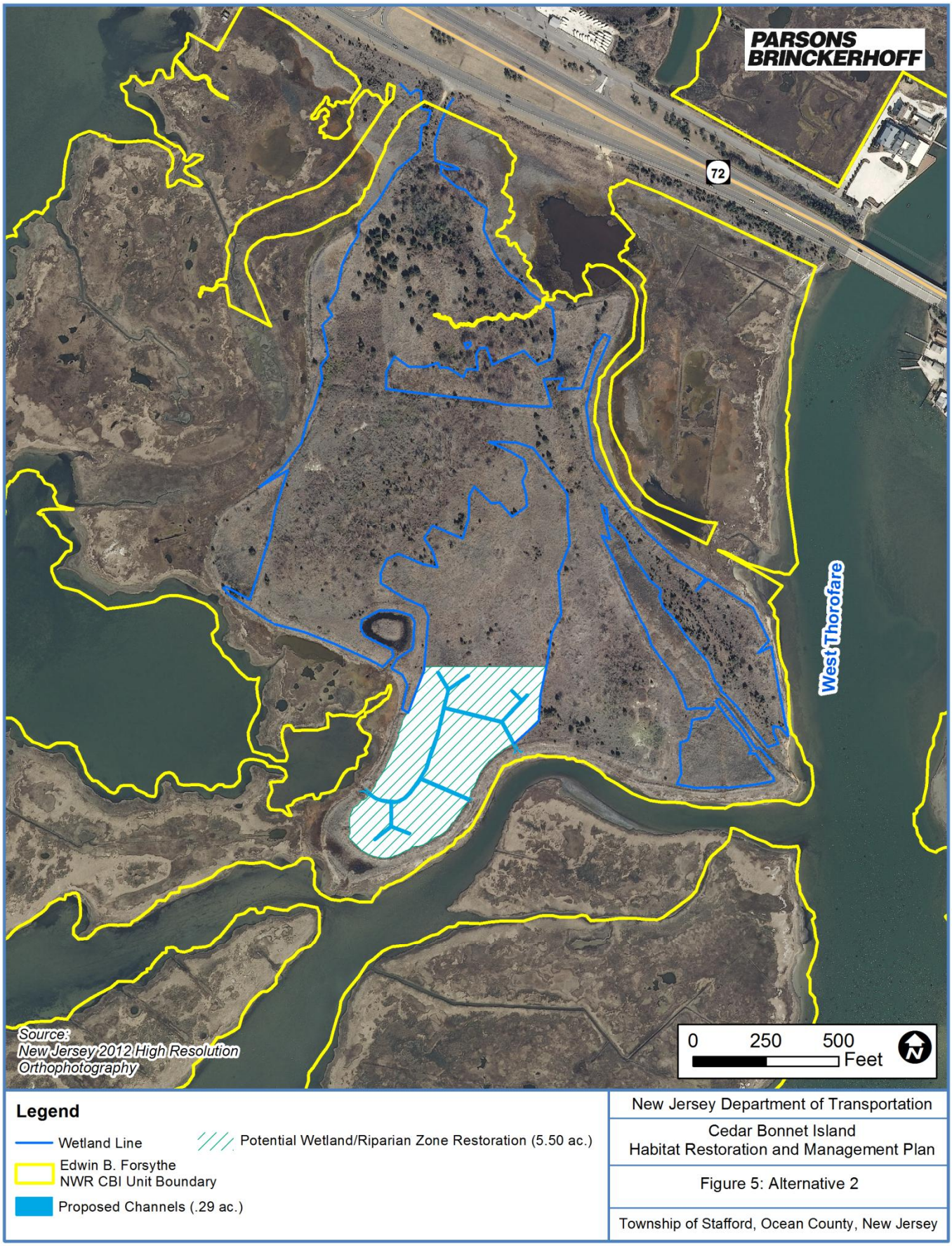


FIGURE 5: ALTERNATIVE 2 - SOUTHWESTERN MITIGATION PROJECT

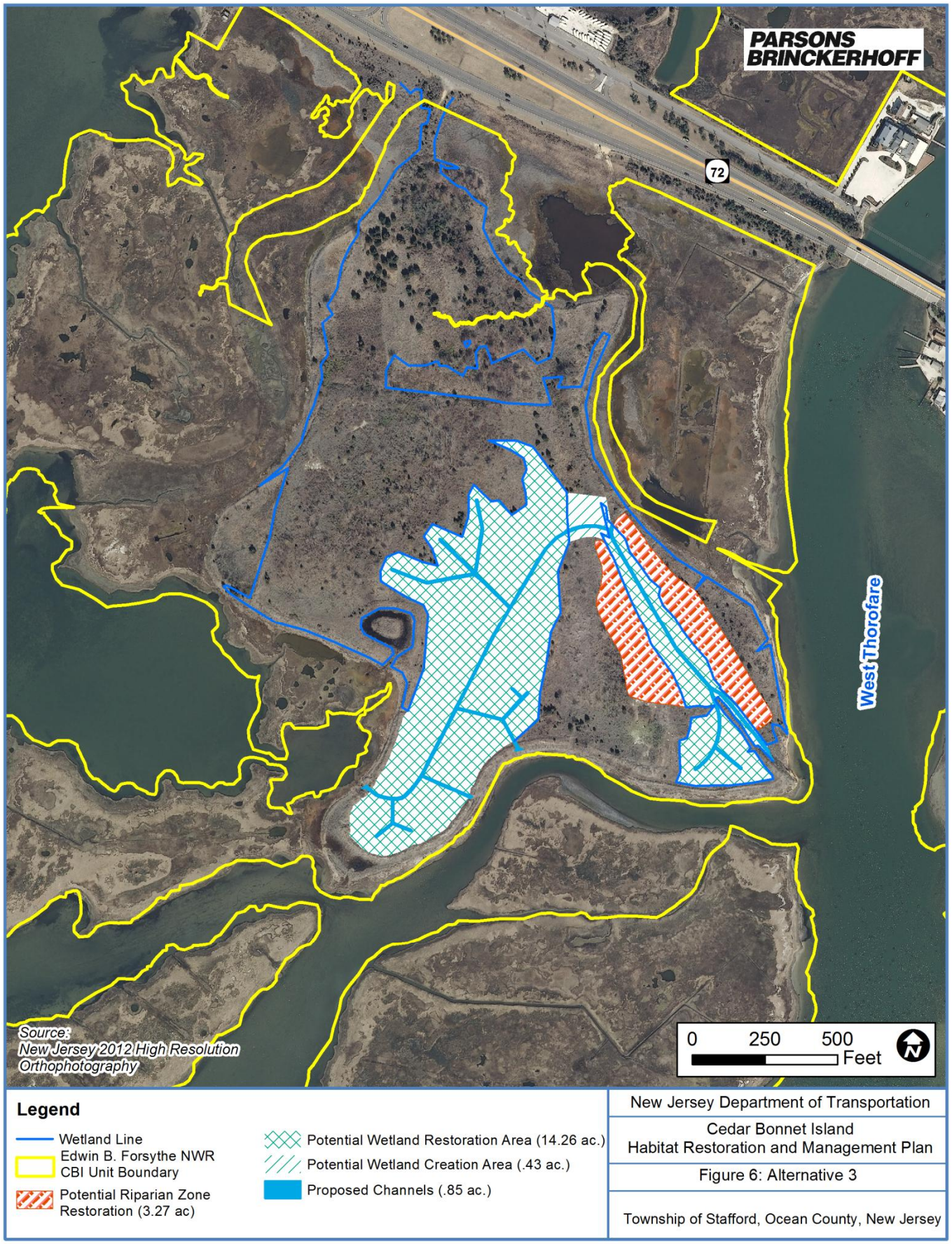


FIGURE 6: ALTERNATIVE 3 - COMBINED MITIGATION PROJECT

Alternative 3 was further refined based on ongoing coordination between the NJDEP, USACE, NJDOT and the Service to meet the goals and objectives of the Habitat Restoration and Management Plan including details about the location and size of disposal areas, the location and size of restoration and enhancement areas, and the location of the proposed public use trail.

Two disposal options, Option A and Option B, were developed and considered during this process. In addition to the public walking trails and viewing platforms that are included in the project's goals and objectives, a boardwalk across the proposed wetland to connect the eastern and western trail as a "loop" trail to increase public use was also suggested. However, the proposed boardwalk was removed from the design due to concerns from the NJDEP and the USACE regarding the construction of a boardwalk within a mitigation site as it would increase disturbance to birds utilizing the newly created wetland areas. Additionally, stakeholders objected due to obscuring the views from adjacent waterways and there were general concerns regarding maintenance of the boardwalk. The eastern trail loop was also removed from the design due to concerns that increased public access in this area would disturb the existing northern diamondback terrapin nesting habitat, as well as wading bird roosting habitat. As a result, the eastern portion of this loop was removed and the western portion of this loop remained with an observation pavilion at its terminus to still provide visitors access to experience this portion of the marsh.

5.3.1 Alternative 3A

Alternative 3A, see Figure 7, proposed to utilize the entire upland area for disposal of dredge material. It resulted in maximum restoration opportunities as approximately 43 acres of the site would be utilized for restoration and enhancement. Because of the larger footprint, there is more land available for wetland and upland restoration. Additionally, more of the berm can be removed under this option, allowing for more efficient and increased tidal flooding. This alternative, however, would impact more of the existing upland woody vegetation.

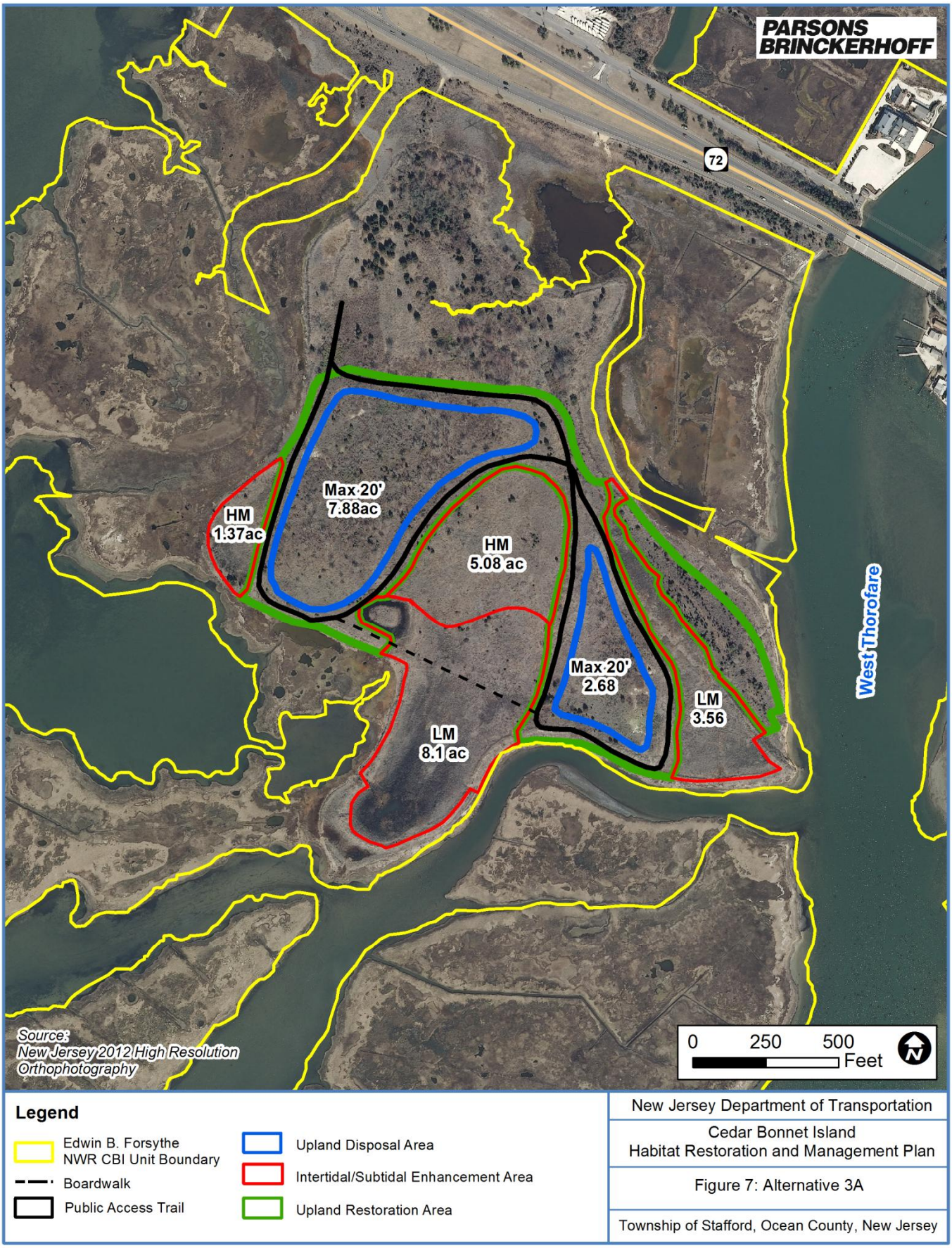


FIGURE 7: ALTERNATIVE 3A

5.3.2 Alternative 3B

Alternative 3B attempted to limit disposal areas to retain more of the existing upland woody vegetation. See Figure 8. As such, it resulted in less restoration opportunities as approximately 35 acres of the site would be utilized for restoration and enhancement. Because of the smaller footprint, there is less land available for wetland and upland restoration.

Table 1 below summarizes the difference between Alternative 3A and Alternative 3B.

TABLE 1: CHARACTERISTICS OF DISPOSAL OPTIONS A AND **B**

	Option A	Option B
Total Management Area (ac)	43	35
Existing Wetlands (ac)	16.9	12.5
Total Wetland Restoration Area (ac)	18.1	13.1
High Marsh (HM) mean elev 1.25'	6.4	7.4
Low Marsh (LM) mean elev 0.85'	11.7	5.7
Proposed Coastal Wetland Creation (ac)	1.2	0.6
Uplands to be Restored (ac)	23	20.4
Disposal Area max elev 20' (ac)	10.6	8
Material to be Excavated (1000 yd3)	100	70
Max Disposal Volume (1000 yd3)	110	70

Ultimately, Alternative 3A was chosen as the preferred disposal option because it allowed for greater restoration and enhancement opportunities than Alternative 3B.

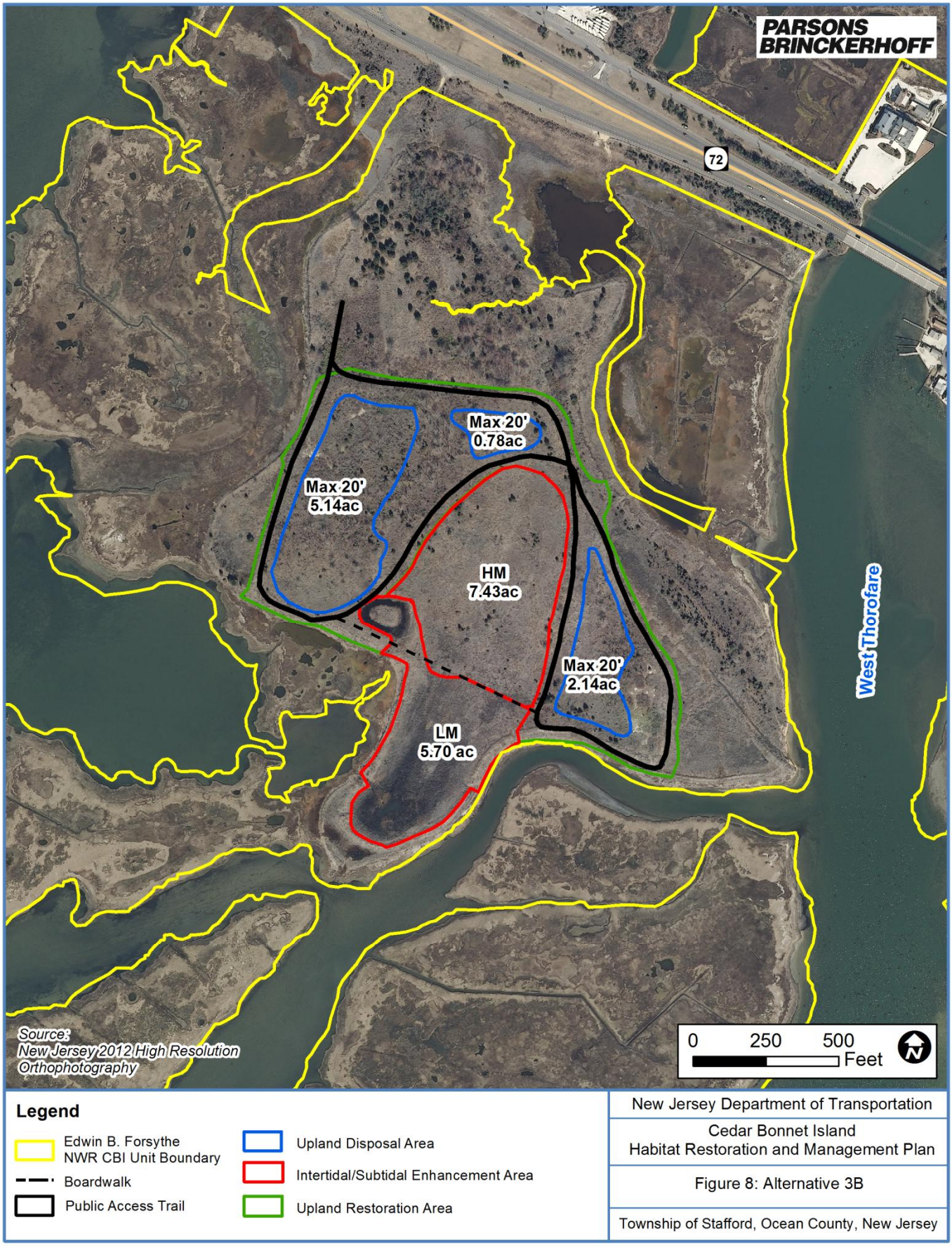


FIGURE 8: ALTERNATIVE 3B

5.3.3 Alternative 3A-Low Trail

Alternative 3A-Low Trail is Disposal Option A with the Low Trail Option, which locates the trail near the bottom of the slope of the Upland Disposal Area (see Figure 9, Low-Trail and High-Trail typical sections on next page). This alternative was designed with a minimum wetland transition area of 25 feet, with a 20-30% slope, and a maximum upland disposal height of 20 feet. The slope of this alternative would allow for a greater disposal area than the high trail option (Alternative 3A-High Trail discussed below). However, for this alternative the trail would be located at a lower elevation limiting the viewsheds that can be experienced by the visitor. Additionally, the 25 foot wetland transition area would limit the number of plantings that could be implemented within this area. Additionally, the eastern loop trail was eliminated due to concerns with increased public access disturbing the northern diamondback terrapin nesting habitat and wading bird roost habitat within the eastern portion of the site. Therefore, this eastern loop trail was replaced with a terminal trail along the eastern portion of the site with a proposed observation pavilion located along the southern bank. A second observation pavilion is also proposed along the southern bank of the western portion of the site along the western loop trail.

5.3.4 Alternative 3A-High Trail (Preferred Alternative)

Alternative 3A-High Trail, the Preferred Alternative, is Disposal Option A with the High Trail Option. The High Trail Option locates the trail at the top of the slope of the Upland Disposal Area. This alternative was designed with a minimum transition area of 50 feet, with a 20% slope, and a maximum upland disposal height of 25 feet. Overall, this alternative would allow for a more varied planting option within the wetland transition zone. Although the disposal area is limited due to the lower slope, this allows the publicly accessible walking trail to be located at a higher elevation, resulting in a more aesthetically pleasing and enjoyable experience for the visitors since it would allow for better viewsheds. Additionally, the eastern loop trail was eliminated due to concerns with increased public access disturbing the northern diamondback terrapin nesting habitat and wading bird roost habitat within the eastern portion of the site. Therefore, this eastern loop trail was replaced with a terminal trail along the eastern portion of the site with a proposed observation pavilion located along the southern bank. A second observation pavilion is also proposed along the southern bank of the western portion of the site along the western loop trail. See Figure 10 for a rendering of the High Trail (Preferred Alternative).

The table below summarizes the mitigation characteristics of Alternative 3A-High Trail, the Preferred Alternative (see Figure 11 for Preferred Alternative).

TABLE 2 : MITIGATION SITE SUMMARY TABLE FOR ALTERNATIVE 3A-HIGH TRAIL

Mitigation Site Summary Table	
Resource	Area (Acres)
Existing Conditions	
Wetlands	18.63
Uplands	26.45
Total	45.08
Proposed Conditions	
Upland Habitat Restoration Area	18.01
Intertidal/ Subtidal Shallows Area	20.23
Upland Enhancement Area	5.44
Terrapin Nesting Area	1.39
Total	45.08

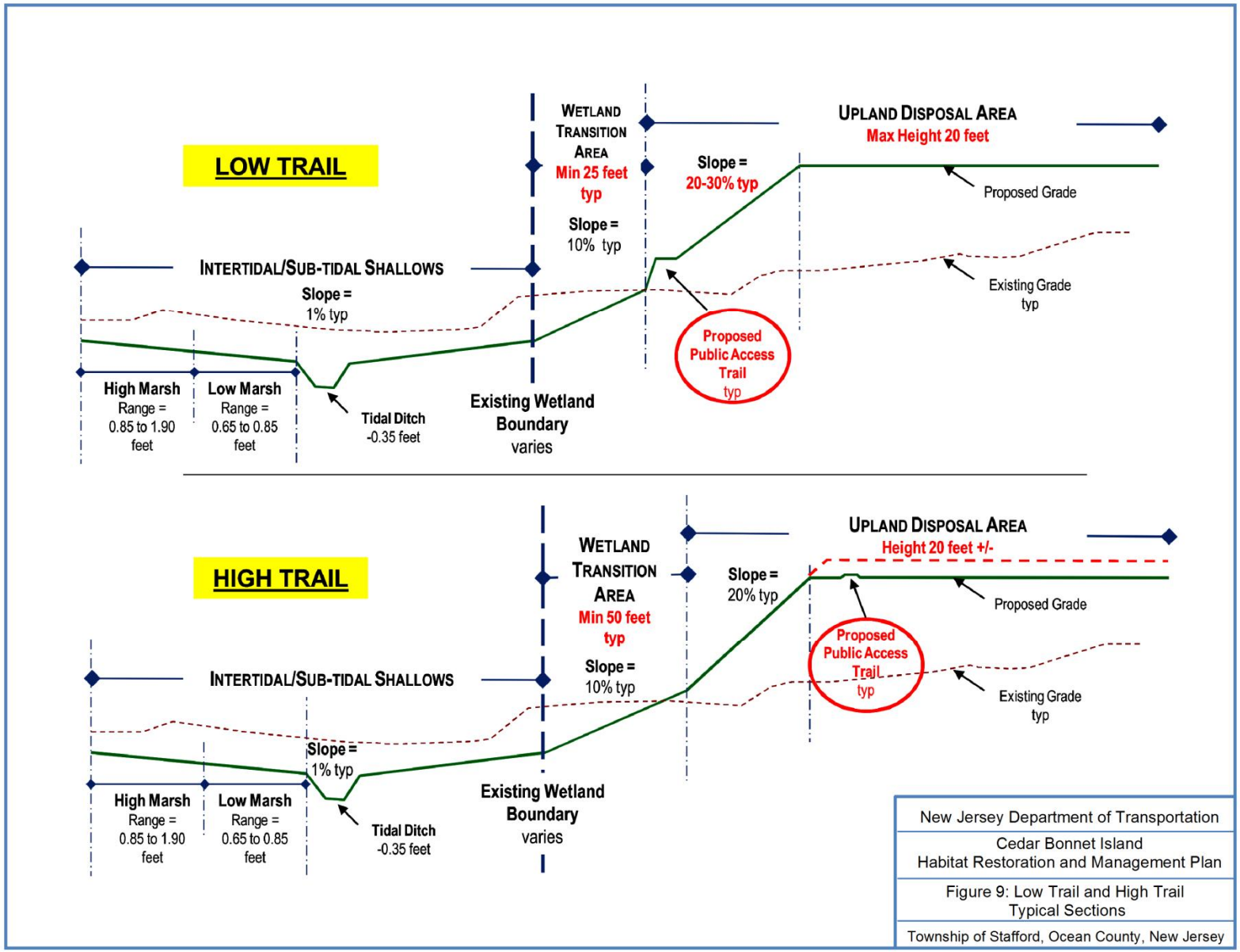


FIGURE 9: LOW TRAIL AND HIGH TRAIL TYPICAL SECTIONS

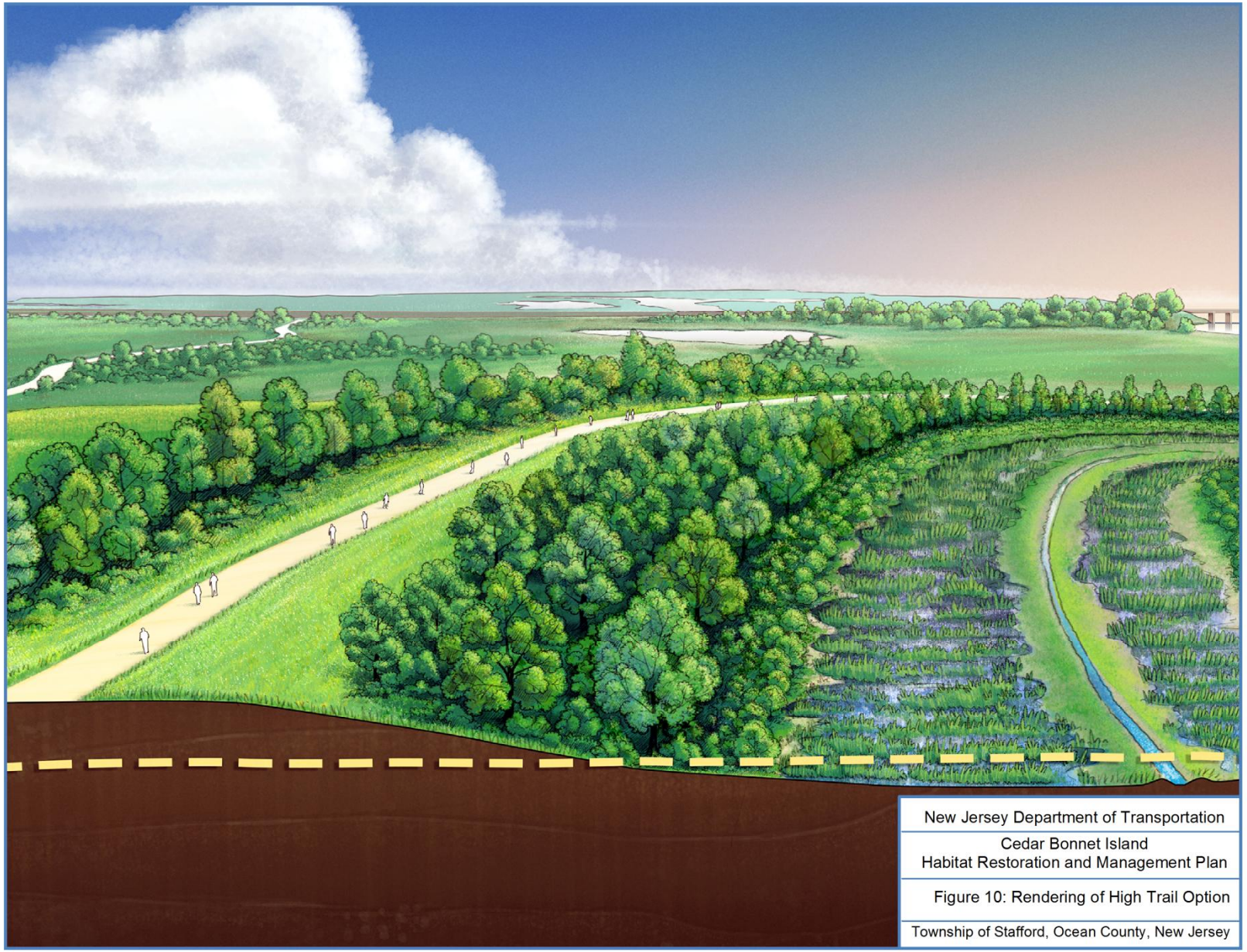


FIGURE 10: RENDERING OF HIGH TRAIL OPTION

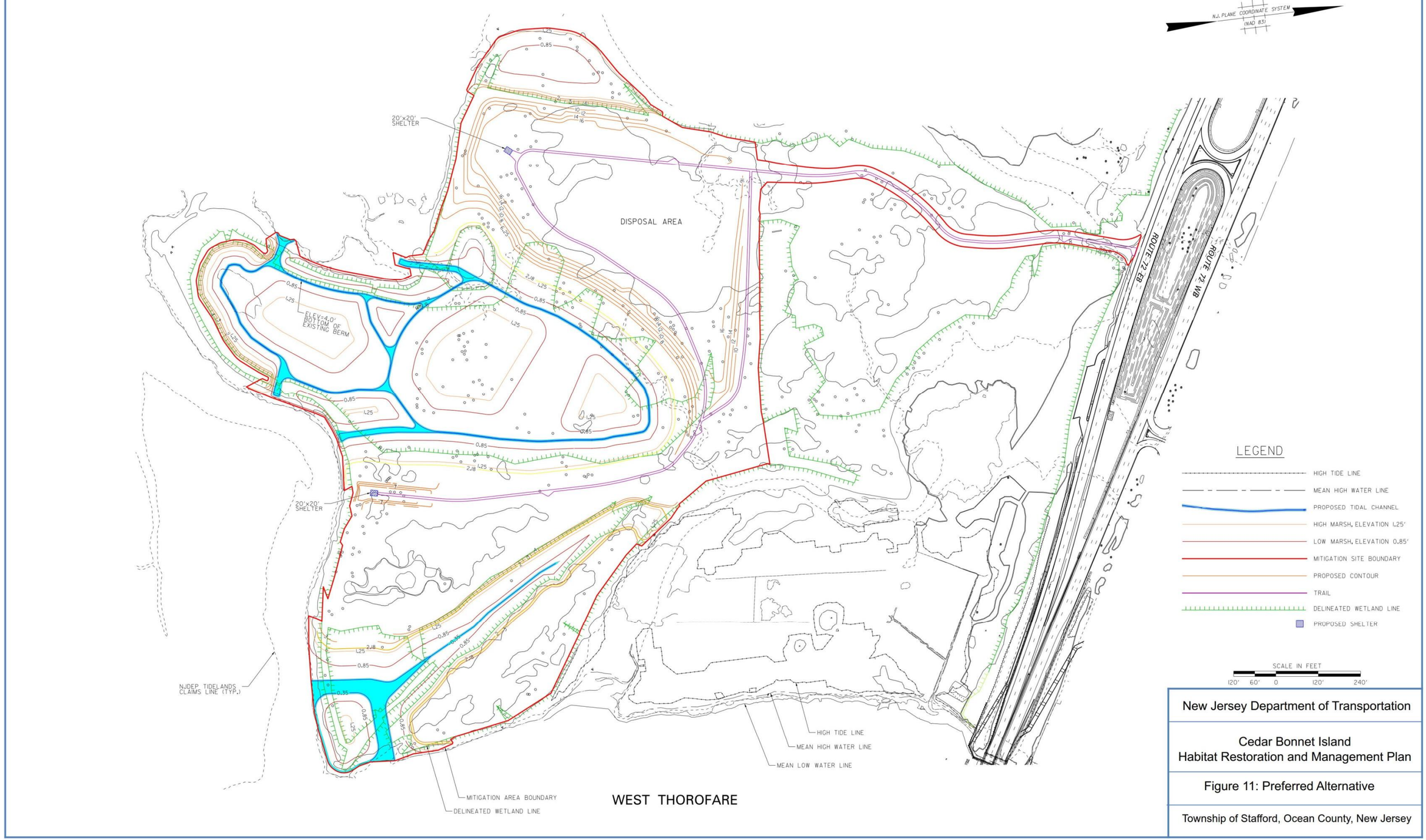


FIGURE 11: PREFERRED ALTERNATIVE

5.4 Alternative 4 – No Action

Under the No Action Alternative, no habitat restoration and enhancement mitigation activities would occur. As a result, the present condition consisting of low quality wetlands would continue to exist into the future with a likely continued increase of invasive vegetation. The Service would continue to manage the CBI Unit and associated habitat as it has in the recent past.

TABLE 3: ALTERNATIVE ANALYSIS MATRIX

Criteria for Evaluation	Alternative 1 (Southeastern Mitigation Project)	Alternative 2 (Southwestern Mitigation Project)	Alternative 3 (Combined Mitigation Project)	Alternative 3A	Alternative 3B	Alternative 3A - Low Trail	Alternative 3A - High Trail (Preferred Alternative)
Biological Environment							
Habitat/Vegetation							
Wetland							
Restoration	3.07 ac.	5.50 ac.	14.26 ac.	18.1 ac.	13.1 ac.	18.62 ac.	18.62 ac.
Creation	0.00 ac.	0.00 ac.	0.43 ac.	1.2 ac.	0.60 ac.	0.00 ac.	0.00 ac.
Upland							
Restoration	3.27 ac.	0.00 ac.	3.27 ac.	23 ac.	20.4 ac.	24.84 ac.	24.84 ac.
Tidal Channel Creation	0.27 ac.	0.29 ac.	0.85 ac.	0.85 ac.	0.85 ac.	1.62 ac.	1.62 ac.
Total Mitigation Area	6.61 ac.	5.79 ac.	18.81 ac.	43.15 ac.	34.95 ac.	45.08 ac.	45.08 ac.
Threatened, Endangered and Candidate Species							
Federal	Negligible Impacts: Habitats for federally-listed threatened and endangered species were not identified within the project limits.						
State	Minor Impacts: State-listed threatened and endangered species are highly mobile. They are expected to avoid direct mortality and would return at the conclusion of the restoration activities.						
Other Wildlife Species	Minor Impacts: Other wildlife species may experience short-term impacts due to construction activities; however, most of these species are highly mobile and would avoid the construction area, and return at the end of construction.						
Physical Environment and Topography							
Land Use	Negligible Impacts: Land use will not change as a result of the implementation of these alternatives. Land cover will change from a degraded wetland community dominated by common reed and poison ivy to a predominately saline marsh ecosystem.						
Cultural Resources	Negligible Impacts: No cultural resources exist within the project area.						
Acid Producing Soils	Minor Impacts: The southeast portion of the site has been identified as having Acid Producing Soils (APS) (approximately 1 acre of acid producing soils will be disturbed).	Medium Impacts: The southern portion of the site has been identified as having Acid Producing Soils (APS) (approximately 6 acres of acid producing soils will be disturbed).	Large Impacts: Acid Producing Soils (APS) have been identified within the southcentral and southeast portions of the project area (approximately 13 acres of acid producing soils will be disturbed).				
Visitor Use and Experience							
Recreation	No passive or recreational elements proposed.	No passive or recreational elements proposed.	No passive or recreational elements proposed.	Good Benefit: Public access trail consisting of a double loop.	Good Benefit: Public access trail consisting of a double loop.	Best Benefit: Public access trail consisting of a western loop trail and an eastern terminal trail which will not disturb sensitive habitat.	Best Benefit: Public access trail consisting of a western loop trail and an eastern terminal trail which will not disturb sensitive habitat.
Aesthetics and Scenic Resources	Minor Benefit: Improved aesthetics and scenic resources.	Minor Benefit: Improved aesthetics and scenic resources.	Medium Benefit: Improved aesthetics and scenic resources.	Large Benefit: Improved aesthetics and scenic resources.	Large Benefit: Improved aesthetics and scenic resources.	Large Benefit: Improved aesthetics and scenic resources.	Largest Benefit: Improved aesthetics and scenic resources.
Design Criteria							
Material to be Excavated (1000 yd3)	This detailed design criteria was not developed for these 3 alternatives as it is premature to do so during this preliminary phase of the alternative analysis.			100	70	100	100
Max Disposal Volume (1000 yd3)				110	70	110	110
Upland Disposal Area				2 upland disposal areas totaling 10.6 acres were designed for this alternative.	2 upland disposal areas totaling 8 acres were designed for this alternative.	2 upland disposal areas totaling 10.6 acres were designed for this alternative.	2 upland disposal areas totaling 10.6 acres were designed for this alternative.
Transition Area				Detailed wetland transition areas were not designed in this alternative phase.		Good Transition-Planting Benefit: Maximum wetland transition area width is 25 feet.	Best Transition-Planting Benefit: Maximum wetland transition area width is 50 feet.
% Slope				Slope was not designed in this alternative phase.		20%-30% slope	20% Slope

6. AFFECTED ENVIRONMENT

The majority of the central portion of the mitigation area was a former dredge spoil disposal site in the 1950s which resulted in degraded freshwater wetlands dominated by common reed and poison ivy with an earthern berm around its perimeter. This area was also subject to herbicide applications for common reed control which also killed the majority of the woody vegetation nearby, which is only now beginning to recover.

Aerial Photo of CBI in 1956

6.1 Biological Environment

6.1.1 Habitat/Vegetation

A. Wetland Vegetation Communities

Wetlands are land areas saturated or inundated with water that generally include swamps, marshes, bogs, and similar areas. The Service has developed a classifications scheme that assigns species to wetland indicator status according to the following parameters:

PLANT AFFINITY FOR WETLAND CONDITION	
Classification	**% Occurrence in Wetlands**
Obligate (OBL)	>99
Facultative Wet (FACW)	67-99
Facultative (FAC)	34-66
Facultative Upland (FACU)	1-33
Upland (UPL)	<1
NIS	No Indicator Status

Pluses or minuses given with these classifications indicate a tendency toward the wetter (+) or drier (-) end of the scale. Hydrophytic vegetation is present if greater than 50% of the dominant plant species from all strata are OBL, FACW, and/or FAC (including FACW+, FACW-, FAC+ and FAC- species).

Wetlands identified within the western and northeastern portions of the site contain estuarine high marsh wetlands with areas of low marsh fringes (Figure 12). In general, the vegetation communities within these wetlands follow a gradient that is primarily based upon elevation above sea level. From the water's edge this gradient starts with a low marsh community dominated by smooth cordgrass (OBL) followed by varying mixtures of saltmeadow cordgrass (FACW+), saltgrass (FACW+), common reed (FACW), and glasswort (*Salicornia spp.,* NIS). Common reed dominates the higher elevations, particularly along the northern perimeter south of Route 72.

The palustrine forested wetlands, located within the central portion of the site, are dominated by red maple (Acer rubrum, FAC) and black willow (*Salix nigra,* FACW+) in the canopy; Southern arrowwood (*Viburnum dentatum,* FAC) and common elderberry (*Sambucus canadensis,* FACW-) in the shrub layer; blackberry (*Rubus spp.,* NIS) in the woody vine layer; and common reed and Japanese knotweed (*Polygonum cuspidatum,* FACU-) in the herbaceous layer. The palustrine emergent wetlands, located within the south-southeastern portion of the site, are dominated by common reed and poison ivy (FAC). Scattered common elderberry shrubs were identified. Note that nearly all of the vegetation in this part of the island was either dead or stressed due to the herbicide treatment.

Cedar Bonnet Island Wetlands

FIGURE 12: WETLANDS MAP

B. Upland Vegetation Communities

Uplands on the site included second growth forest and late successional fields on upland berms. Vegetation within the forested uplands, located in the northern, central, southern, and southeastern portions of the site, consisted primarily of Eastern cottonwood (*Populus deltoides,* FAC) and Eastern red cedar (*Juniperus virginiana,* FACU) in the canopy layer; Eastern red cedar and sassafras (*Sassafras albidum,* FACU-) saplings; groundsel tree (*Baccharis halimifolia,* FACW), common elderberry (*Sambucus canadensis*), and bayberry (*Morella* spp., NIS) in the shrub layer; poison ivy and blackberry(*Rubus fruticosus)* in the woody vine layer; and pokeweed (*Phytolacca americana,* FACU+) and common reed in the herbaceous layer.

Vegetation within the late successional fields on upland berms, located along the southern perimeter of the site, consisted primarily of Eastern red cedar trees and saplings; sassafras saplings; groundsel tree, bayberry, common elderberry, and high tide bush (*Iva frutescens,* FACW+) in the shrub layer; poison ivy and blackberry in the woody vine layer; and common reed in the herbaceous layer.

6.1.2 Threatened, Endangered, and Candidate Species

A. Federal Species

In order to obtain Service information on federally-listed threatened and endangered species within the project area, the current Service procedures for determining if an action is subject to Section 7 Consultation pursuant to the Federal Endangered Species Act (ESA) were consulted. In accordance with these procedures the "Federally Listed and Candidate Species Occurrences in New Jersey by County and Municipality" list was reviewed, as well as the Service Information, Planning and Conservation System (IPaC). It was determined that the piping plover (*Charadrius melodus,* federally threatened), swamp pink (*Helonias bullata,* federally threatened), and the Knieskern's beaked-rush (*Rhynchospora knieskernii,* federally threatened) could potentially be present in Stafford Township (Appendix B).

An evaluation of the habitat requirements, as provided by the Service, for each of the aforementioned species was conducted to determine if habitats of these species could potentially be located within the study area and are described below:

Piping plover


Piping Plover

Piping plovers are present on the New Jersey shore during the breeding season, generally between March 15 and August 31. They nest above the high tide line, usually on sandy ocean beaches and barrier islands, but can also nest on gently sloping foredunes, blowout areas behind primary dunes, washover areas cut into or between dunes, the ends of sandpits, and deposits of suitable dredged or pumped sand. Piping plover nests consist of a shallow scrape in the sand, frequently lined with shell fragments and often located near small clumps of vegetation. As such, the study area is not considered to be a potentially suitable habitat of the piping plover.

Swamp pink

Swamp Pink

An obligate wetland species, swamp pink occurs in a variety of palustrine forested wetlands including swampy forested wetlands bordering meandering streamlets, headwater wetlands, sphagnous Atlantic white-cedar swamps, and spring seepage areas. Specific hydrologic requirements of swamp pink limit its occurrence within these wetlands to areas that are perennially saturated, but not inundated, by floodwater. Common vegetative associates of swamp pink include Atlantic white-cedar (*Chamaecyparis thyoides*), red maple, pitch pine (*Pinus rigida*), American larch (*Larix laricina*), black spruce (*Picea mariana*), red spruce (*P. rubens*), sweet pepperbush (*Clethra alnifolia*), sweetbay magnolia (*Magnolia virginiana*), sphagnum mosses (*Sphagnum spp.*) cinnamon fern (*Osmunda cinnamomea*), skunk cabbage (*Symplocarpus foetidus*), and laurels (*Kalmia spp.*).

A wetland delineation identified palustrine forested wetlands, a known habitat of the swamp pink, within the study area. However, common vegetative associates of the swamp pink were not identified within the study area and the hydrology within the forested wetland is not suitable for swamp pink. As such, the study area is not considered to be a potentially suitable habitat of the swamp pink.

Knieskern's beaked-rush

An obligate wetland species, Knieskern's beaked-rush occurs in early successional wetland habitats, often on bog-iron substrates adjacent to slow-moving streams in the Pinelands region. This species is also found in human-disturbed wet areas that exhibit similar early successional stages due to water fluctuation or periodic disturbance from vehicles, mowing, or fire. These human-influenced habitats include abandoned borrow pits, clay pits, ditches, rights-of-way, and unimproved roads. Knieskern's beaked-rush is often associated with other sedge and grass species. However, it is intolerant of shade and competition, especially from woody species, and is sometimes found on relatively bare substrates.

A field visit did not identify the necessary habitat of the Knieskern's beaked-rush. The Knieskern's beaked-rush requires open emergent freshwater wetlands with no shade and little competition. Emergent wetlands observed in the vicinity of the project area consisted of tidally influenced, coastal wetlands as well as degraded freshwater wetlands dominated by common reed. Furthermore, the study area is not located within the Pinelands region. As such, the study area is not considered to be potentially suitable Knieskern's beaked-rush habitat.

Since no federally-listed threatened or endangered species or their habitats were observed within the study area during field investigations, a no effect determination has been made per the Service's procedures for determining if an action is subject to Section 7 Consultation (see Appendix C).

C. State Species

A review of the New Jersey Landscape Project Version 3.1, accessed November 2012, was consulted in order to determine if any records of rare, threatened or endangered species or their habitat have been documented within or adjacent to the project area (See Figure 13). The NJDEP Landscape Project determined that the following state threatened or endangered species and/or their habitat could potentially occur within the project area:

Black-crowned night-heron

- Black-crowned night-heron (*Nycticorax nycticorax,* State Threatened - Foraging)
- Northern harrier (*Circus cyaneus,* State Endangered - Nesting)
- Roseate tern (*Sterna dougallii,* Federally Endangered and State Endangered – Foraging and Nesting Colony)
- Yellow-crowned night-heron (*Nyctanassa violacea,* State Threatened – Foraging)

Field investigation identified habitat for all of the bird species listed above as present in the vicinity of the project area; however, none of these species were observed nesting within the project area. Additionally, during field investigations in 2009, two active osprey nests (on man-made platforms) were observed on the CBI Unit; one was located near the southern tip of the island approximately 2,000 feet from Route 72 and one was located near the northern tip of the island at least 1,000 feet from the Route 72 alignment. In 2012, surveyors performing a wetland delineation observed that the two osprey platforms no longer contained active nests. Despite this, one osprey was seen in flight around the island. Although the osprey is listed as a state threatened species, it was not identified as potentially occurring within the project area during the November 2012 review of the New Jersey Landscape Project Version 3.1.

FIGURE 13: THREATENED AND ENDANGERED SPECIES MAP

6.1.3 Other Wildlife Species

Red Fox

Potential wildlife communities within the project study area were identified through technical reports, publications ("New Jersey Breeding Bird Atlas" by Walsh et al. 1999), field guides, and limited field surveys. Potentially-occurring herptile (amphibians and reptiles) and mammal species were identified using distribution and abundance information in "Vertebrates of New Jersey" (Stiles, 1978), Conant (1975), and Burt and Grossenhieder (1976).

Birds were observed in the project area during several field visits. The New Jersey Breeding Bird Atlas shows evidence of possible breeding for 72 bird species within a 9 square mile block surrounding the Route 72 Manahawkin Bay Bridges project area (1/6 of the Ship Bottom Quad), but not all of these species can be expected to breed in the immediate vicinity of the project.

Although not observed during field surveys, several common mammals could be expected to inhabit sites in the study area. These species may include: eastern cottontail (*Sylvilagus floridanus*), raccoon (*Procyon lotor*), muskrat (*Ondatra zibethicus*), Norway rat (*Rattus norvegicus*), red fox (*Vulpes vulpes*), and Virginia opossum (*Didelphis virginiana*) (Stiles 1978; Burt and Grossenhieder 1976; Bosakowski and Pitler 1984). The potential for any significant amphibian population on the site is anticipated to be low due to the lack of significant freshwater wetlands in the area. Reptiles are limited to common species such as the garter snake (*Thamnophis sirtalis*), northern brown snake (*Storeria dekayii*), eastern milksnake (*Lampropeltis triangulum*), snapping turtle (*Chelydra serpentina*), eastern painted turtles (*Chrysemys picta*), and northern diamondback terrapin. Aquatic/nekton species may include blue crab (*Callinectes sapidus*), winter flounder (*Pseudopleuronectes americanus*), and marsh grass shrimp (*Palaemonetes vulgaris*).

6.2 Land Use

According to the NJDEP 2007 Land Use/Land Cover data and land use data from Stafford Township (Figure 14), the current land use of the habitat restoration and enhancement area is categorized as wetlands. This is consistent with the wetland delineation that identified estuarine high marsh wetland in the western and east-northeastern portions of the site, palustrine forested wetlands in the central portion of the site and palustrine emergent wetlands within the southern and southeastern portions of the site. Additionally, the adjacent land uses to the north consist of commercial, industrial, major roadway, other urban or developed land, recreational land, forest, and wetlands.

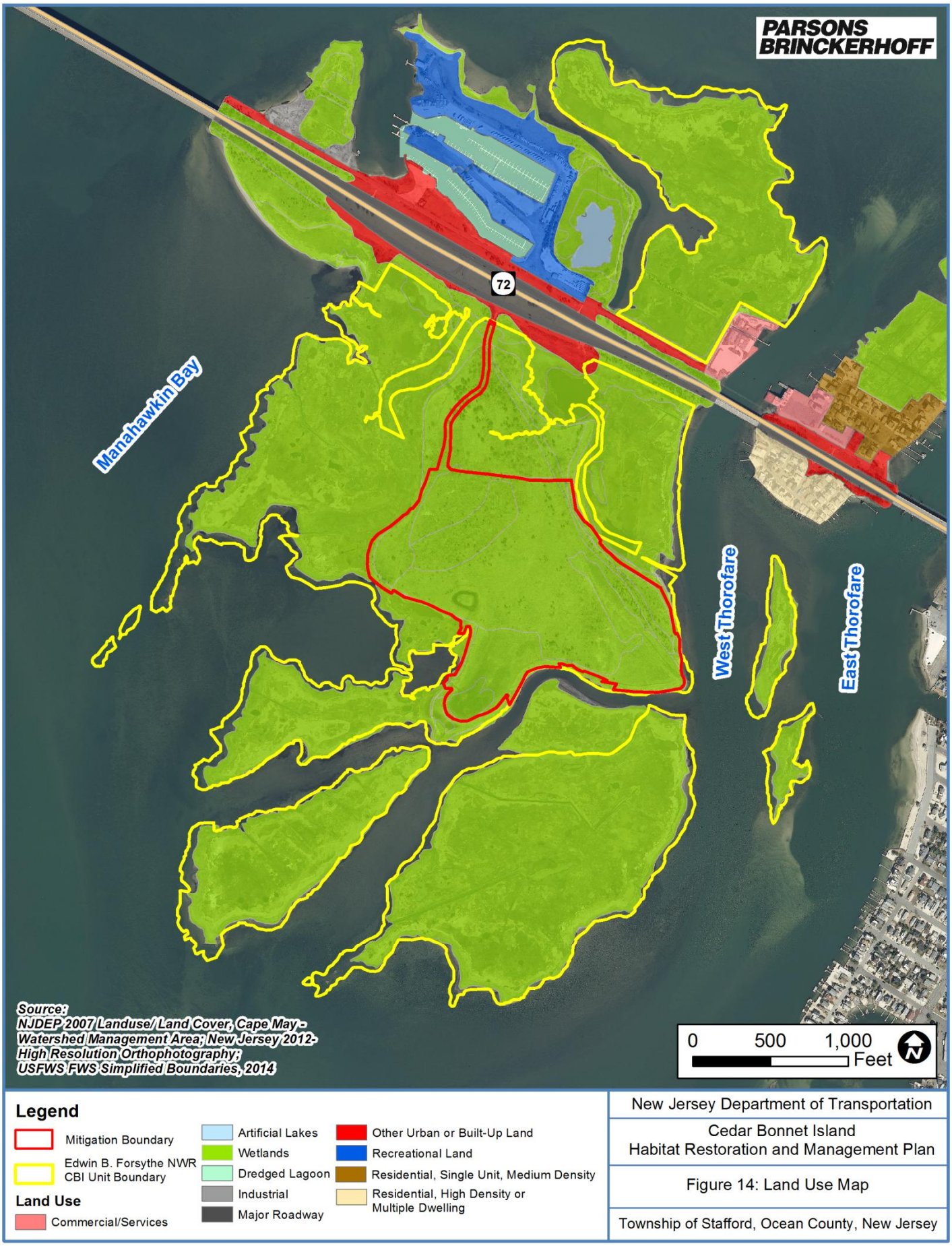


FIGURE 14: LAND USE MAP

6.3 Cultural Resources

All federally funded projects must consider the impact of the project on historic and prehistoric resources according to Section 106 of the National Historic Preservation Act. A Cultural Resources Screening report was prepared by Richard Grubb & Associates, Inc. dated November 16, 2012 within the CBI Area of Potential Effect for both archaeology and historic architecture.

The archaeological screening included background research at the New Jersey State Historic Preservation Office (SHPO) and the New Jersey State Museum to identify registered archaeological sites within, or in the vicinity of, the project area. A visual reconnaissance and geomorphological investigation was conducted in March 2012 and August 2012, respectively.

The historic architectural screening also included background research at the SHPO to identify properties that are listed in or eligible for the New Jersey and National Registers of Historic Places. Field reconnaissance was conducted in May 2012 to identify the presence or absence of known architectural resources within and in the vicinity of the project area, and to identify resources more than 50 years of age that are potentially eligible for the National Register of Historic Places. The Cultural Resources Screening report concluded that historic properties will not be affected by the creation of a mitigation site on the CBI Unit. No further archaeological or architectural surveys were recommended. SHPO was consulted and has concurred (Appendix A).

6.4 Contamination

A Contamination Screening Report conducted by Prestige Environmental, Inc. dated December 2012, concluded that there was no visual evidence of surficial spills and releases such as soil discoloration or petroleum odors. However, patches of distressed/dead vegetation, caused by the spraying of herbicides to control invasive plant species, was evident in the southern portion of the island.

Soil samples were collected at the designated locations (Figure 15) to characterize the soil on the site and determine if any constituents of concern were present. The analytical results were compared to the NJDEP Residential Direct Contact Soil Remediation Standards (RDCSRS), Default Impact to Groundwater Soil Screening Levels (IGWSSL) and the NJDEP Ecological Screening Criteria (ESC) (NJDEP 2011). No compounds of concern were detected at levels above the corresponding RDCSRS. Concentrations of compounds including, but not limited to, aluminum, beryllium, cadmium, manganese, mercury and nickel at some locations exceeded the IGWSSL and the ESC. However, the USFWS New Jersey Field Office – Ecological Services Unit determined that further soil sampling was not warranted and that there are no concerns with the potential for toxicity exposure based on the results submitted.

FIGURE 15: SOIL SAMPLING LOCATION MAP

7. ENVIRONMENTAL CONSEQUENCES

This section presents the environmental consequences of the Preferred Alternative. Alternative 3A – High Trail has been identified as the Preferred Alternative because it most effectively meets the purpose and needs of the project while optimizing the restoration and enhancement benefits. This alternative also meets the goals and objectives of the Refuge's CCP and HMP.

7.1 Wetland Vegetation Communities

A. No Action Alternative

Under the No Action Alternative, no wetlands would be created or enhanced on the CBI Unit. No impacts or construction would occur that would entail removal or alteration of existing wetland vegetation communities, or wetland wildlife habitat within the project area. Consequently, no new or restored wetland wildlife habitat would result under this alternative. The Refuge would continue to manage the CBI Unit as it has in the past for the benefit of waterfowl and passerine species.

B. Preferred Alternative

Implementation of the Preferred Alternative would restore approximately 20 acres of degraded wetland habitat to a more pristine salt marsh wetland habitat. There are approximately 18 acres of degraded common-reed dominated wetland habitat currently on the project site. The restoration of the existing degraded wetlands on the project site, to a tidally influenced wetland community, would restore the salt marsh habitat that was once historically present on site. This restoration would also have long-term beneficial impacts to existing wildlife habitat on site by removing invasive plant species and by planting native plant species to serve as high value foraging habitat. Wetland fauna and wetland dependent migratory birds will benefit in the long term by providing improved wetland habitat communities.

The habitat losses associated with the Preferred Alternative would involve either temporary loss of habitat that would be restored at the end of construction, or the replacement of one habitat type with another. Approximately 1 acre of the degraded common-reed dominated wetlands will be permanently converted to high quality upland habitat; however, the Preferred Alternative will also create approximately 3 additional acres of pristine wetland habitat. Only temporary short-term impacts to wetland vegetation are anticipated as a result of vegetation removal and excavation during construction activities; however, this vegetation would be restored or replaced by other high quality habitat at the end of construction.

7.2 Upland Vegetation Communities

A. No Action Alternative

Under the No Action Alternative, no upland habitat would be created or enhanced on the CBI Unit. Consequently, no new or restored upland wildlife habitat would result under this alterative. No impacts or construction would occur that would entail removal or alteration of existing upland

vegetation communities or wildlife habitat within the project area. The Refuge would continue to manage the CBI Unit as it has in the past for the benefit of waterfowl and passerine species.

B. Preferred Alternative

There are approximately 26 acres of existing upland habitat on the project site. Implementation of the Preferred Alternative will result in the restoration of approximately 18 acres of upland habitat. The restoration activities include the establishment of approximately 6 acres of upland forest, 2 acres of upland scrub-shrub, 5 acres of upland transit shrub, and 5 acres of meadow communities. Approximately 6 acres of existing upland will be enhanced with supplemental plantings and 1 acre will be left undisturbed in its current state and be preserved as northern diamondback terrapin nesting habitat.

Upland vegetation communities, located within the project area, will experience temporary short-term impacts during construction. However, measures will be taken to prevent damage or injury to existing trees, plants and other vegetation adjacent to the proposed mitigation site. If any material outside the excavation limits become disturbed, measures will be taking to restore the area as directed. Furthermore, these upland communities would be restored to high quality habitat at the end of construction.

The implementation of the Preferred Alternative would have long-term positive impacts to upland vegetation communities by providing high quality upland habitat. Additionally, the restoration of upland habitat would have a long-term positive impact to wildlife as it will provide improved habitat values for upland forest, scrub-shrub, and meadow dwelling species.

7.3 Wildlife & Threatened and Endangered Species

A. No Action Alternative

Under the No Action Alternative, impacts to vegetation, wildlife, and threatened and endangered species associated with the proposed project site would not occur. No impacts or construction would occur that would entail removal or alteration of existing vegetation communities or wildlife habitat within the project area.

B. Preferred Alternative

a. Federal Species

Although habitat for the Federally threatened Piping plover, Swamp pink, and Knieskern's beaked-rush are documented as potentially occurring within the project area, field visits and an evaluation of the habitat requirements for these species concluded that the project site did not provide suitable habitat for the aforementioned species. Accordingly, no Federally-listed threatened and endangered species are likely to be adversely impacted by the Preferred Alternative.

b. State Species

As stated in Section 6.1.2, although habitats for the state threatened Black-crowned night-heron, state endangered Northern harrier, Federally and State endangered Roseate tern, and State

endangered Yellow-crowned night-heron were identified as occurring within the vicinity of the project area, these species were not observed nesting within the project area. Nevertheless, these species could still be subjected to short-term impacts due to temporary displacement from the project area during construction by heavy machinery activity, increased noise levels, vegetation clearing, and earth moving activities. However, avian species are highly mobile and are expected to avoid direct mortality, and would quickly return to the site following restoration activities due to the projected high value foraging habitat that will be provided by the proposed marsh, tidal channels, and mudflats.

c. Other Wildlife Species

Mammals may experience temporary short-term impacts due to construction activities on the project site. During construction, heavy machinery activity, increased noise levels, vegetation clearing, and earth moving activities may cause mortality of some of the smaller less mobile mammal species and displacement of other individuals. Most mammals are highly mobile and would avoid the construction area, but would return after construction completion. Long-term beneficial impacts to mammals would result from the conversion of the existing common reed-dominated habitat to a salt marsh ecosystem for species that utilize salt marsh habitat and improved upland habitat values for upland dwelling species.

7.4 Land Use & Land Cover

A. No Action Alternative

Under the No Action Alternative no change in land use and land cover would occur and the Service would continue to manage the CBI Unit as it has in the past.

B. Preferred Alternative

The land use within the project area is currently designated as wetlands and will not change as a result of implementation of the Preferred Alternative. Therefore, no significant or long-term impacts to land use are expected as a result of the Preferred Alternative.

The Preferred Alternative would result in a change of land cover from a degraded wetland community dominated by common reed and poison ivy to a predominately saline marsh ecosystem with components of upland forest, upland herbaceous and scrub-shrub habitats. As such, the Preferred Alternative would have long term positive impacts to land cover.

7.5 Cultural Resources

A. No Action Alternative

As discussed in section 6.3, there are no cultural resources located within the project area. Therefore, under the No Action Alternative cultural resources would not be impacted.

B. Preferred Alternative

As discussed in section 6.3, there are no cultural resources located within the project area. Therefore, under the Preferred Alternative cultural resources would not be impacted.

7.6 Geology and Soils

A. No Action Alternative

Under the No Action Alternative, the site would not be developed. The soils would therefore remain undisturbed and no impact to geology or soils would occur.

B. Preferred Alternative

Acid Producing Soils (APS) have been identified within the south central and south east portions of the project area. All APS will be stored and disposed of within the project limits. All stockpiles will be contained using silt fence, hay bales, or other non-vegetative erosion control features to limit movement of soil and possible acidic runoff. The equipment used for the movement of the APS will be cleaned at the end of each working day and before removing it from the project area to prevent the spreading of APS to other areas within the project area and to prevent tracking of APS off-site.

Short-term adverse affects to geology and soils during construction will be minor or negligible and will be mitigated by installing erosion control methods, and by excavating the tidal channels at low tide.

7.7 Topography

A. No Action Alternative

Under the No Action Alternative, no development would occur on the project site. The topography would therefore remain undisturbed and no impact would occur.

B. Preferred Alternative

As previously mentioned, the CBI Unit was used as a dredge disposal facility until the 1950's and the thickness of the dredged material deposited onto the site varies between 3 to 14 feet. The deposited dredge spoils may cover native soil types, much of which were former tidal marshes. Implementation of the Preferred Alternative would create grading changes throughout the project site which are expected to be beneficial by restoring portions of the site to its original wetland grade elevation.

The existing topography would be modified throughout the majority of the site and would involve: excavation of accumulated dredge spoils, historic land fill material, and common-reed dominated areas; creation of intertidal areas, including the creation of tidal creeks to support tidal hydrology; and the deposition of excavated spoil material onto the designated on-site Disposal Area. No trees, shrubs, and other landscape features will be removed from areas outside of designated grading areas. Additionally, measures will be taken to prevent damage or injury to existing trees, plants and other vegetation adjacent to the proposed mitigation site. If any material outside the excavation

limits become disturbed, measures will be taking to restore the area as directed. Short-term adverse affects to geology and soils during construction will be minor or negligible and will be mitigated by installing soil erosion control measures.

As stated in Section 5.3.4., the Preferred Alternative includes the design of a transition area that will be at least 50 feet, with a 20% slope, and a maximum upland disposal height of 25 feet. This will result in long-term positive impacts to aesthetic and scenic resources because the publicly accessible walking trail will be located at a higher elevation creating enhanced scenic viewsheds which would result in a more aesthetically pleasing and enjoyable experience for visitors.

7.8 Recreation

A. No Action Alternative

Under the No Action Alternative, passive recreational opportunities are proposed for the CBI Unit as outlined in the Refuge's CCP Plan. Goal 4 of the CCP is to "Provide opportunities for high-quality compatible, wildlife-dependent public use". Objective 9 is to "Expand compatible wildlife observation and photography opportunities on the Refuge" and Objective 11 is to "Expand compatible environmental education and interpretation opportunities both on and off the Refuge". Objective 9 - Strategy B specifically recommends to "construct universally accessible observation platforms with appropriate parking areas at Bonnet Island".

B. Preferred Alternative

Currently the CBI Unit is not open for public use. The implementation of the Preferred Alternative would open the CBI Unit for public use and provide passive recreational opportunities in an environment that is easy to navigate. The Preferred Alternative, which would offer an ADA compliant walking trail, two designated wildlife observation areas (one at the southeastern corner of the site and one at the southwestern corner of the site), and an interpretive signage and way-finding program, will create long-term positive impacts to recreation. The Preferred Alternative also meets the goals and objects of the Refuge's CCP Plan.

7.9 Aesthetics and Scenic Resources

A. No Action Alternative

Under the No Action Alternative, aesthetic and scenic resources would not be enhanced and the project area would continue to exist as it has in the past, which includes being closed to the public.

B. Preferred Alternative

Short-term adverse impacts to the aesthetic and scenic resources would be minor as a result of the Preferred Alternative. Aesthetic values would be reduced temporarily during construction due to the presence of construction equipment and construction activities. However, these impacts would be temporary, and scenic and aesthetic values would be restored and enhanced as a result of the Preferred Alternative.

Long-term positive impacts to aesthetic and scenic resources would occur from implementation of the Preferred Alternative. The implementation of diverse upland habitats, a restored wetland community, the construction of a walking trail, and the re-introduction of native plant species will help to create improved scenic viewsheds and a more aesthetically pleasing environment.

8. MITIGATION WORK PLAN

The following is a detailed written specification and work description of the proposed project.

8.1 Impact Site

Intertidal/subtidal shallows are defined as habitat located between the Spring High Tide elevation and an elevation four feet below the mean low water elevation. Intertidal and subtidal shallows are present in the vicinity of the Route 72 corridor in Manahawkin Bay. Based upon on-site tide gauge data, the spring high water line is +2.18 feet NAVD 1988. The Mean Low Water is +0.39 feet NAVD 1988. Therefore, any development, filling, or dredging to land -3.224 feet NAVD 1988 to +2.18 feet NAVD 1988 will be considered impacts to intertidal/subtidal shallows. Intertidal/subtidal shallows can be divided into vegetated and non-vegetated shallows. The vegetated shallows are either wetlands (typically low marsh) or submerged aquatic vegetation beds. Vegetated shallows can be impacted both by direct impact associated with grading or fill or by indirect impact associated with shading and sedimentation. Non-vegetated shallows are only impacted by grading or filling. The Habitat Restoration and Enhancement Mitigation Plan will only mitigate for non-vegetated intertidal/subtidal shallows impacts to address NJDEP mitigation requirements. Impacted intertidal/subtidal shallows that were vegetated with emergent vegetation are considered to be tidal wetlands, which will be mitigated as part of the separate Route 72 ROW Mitigation Project, (located adjacent to the CBI Unit along the NJDOT Route 72 eastbound ROW) to address USACE mitigation requirements. Impacted intertidal/subtidal shallows that contain submerged aquatic vegetation (SAV) will be mitigated as part of a separate SAV mitigation project in consultation with the NJDEP Bureau of Shellfisheries and the National Marine Fisheries Service (NMFS).

Regulated riparian zone is also present within the project limits. The riparian zone was determined to be within 50 feet of the mean high water of Manahawkin Bay. A majority of the proposed riparian zone impacts will occur within previously developed land or within the alignment of the existing roadway. However, some unavoidable impacts to forested and grassed riparian zones will also occur due to the Route 72 roadway project. As such, the Habitat Restoration and Enhancement Mitigation Plan will also mitigate for riparian zone impacts to address NJDEP mitigation requirements.

8.2 Reference Wetlands

Biological benchmarks were collected to establish elevations at which the various plant communities naturally occur within the site. A total of 28 bio-benchmark elevations were obtained along five transects in most cases within four distinct plant communities:

- Non-vegetated open water at the edge of smooth cordgrass low marsh,
- Low marsh dominated by smooth cordgrass,
- Intertidal high marsh dominated by saltgrass, and
- Intertidal marsh dominated by common reed.

Because the smooth cordgrass growth will occur within a range of elevations, we obtained measurements of both the upper and lower limits of where this plant exhibited high vigor (Table 2). Based on a review of these data, the average lower elevation for smooth cordgrass within the site is 0.55 feet NAVD 88 and the average upper elevation for smooth cordgrass is 0.81 feet NAVD 88. Smooth cordgrass is found at an extreme low elevation of 0.11 feet NAVD 88 and an extreme upper elevation of 1.12 feet NAVD 88. If these outliers are removed from the average, the lower limit averaged 0.65 feet NAVD 88 and the upper limit averaged 0.74 feet NAVD 88.

The average elevation for the high quality high marsh is 1.09 feet NAVD 88. The common reed is found to occur within the upper range of wetland elevations on site, typically above 1.01 feet NAVD 88 outside of the dredge spoils berms. Inside the berms, common reed dominates the entire wetland which ranges in elevation from 2.86 feet NAVD 88 to 6.75 feet NAVD 88. However, the hydrology for the wetland located within the bermed area is associated with surface runoff and is not considered to be a tidal wetland.

Salinity within this portion of the bay ranges from 28.7 parts per thousand (ppt) to 32.1 ppt. According to a factsheet prepared by the Massachusetts Department of Conservation and Recreation http://www.mass.gov/dcr/waterSupply/lakepond/factsheet/Phragmites.pdf which discusses methods of common reed control, "increasing the salinity and tidal action to the area has been shown to cause a decline common reed and an increase in other native plants." According to Bart and Hartman (2003), research on plant dispersal mechanisms has found that higher salinity input reduces the survival of common reed rhizomes. Burdick and Konisky (2003) recommend that, "the restoration of natural hydrology to disturbed saltmarsh habitat should be a critical preemptive tactic in the control of common reed expansion. [and that] Managers could remove tidal restrictions, reroute freshwater inputs from development, and prohibit fill along upland margins."

TABLE 4 : BIOLOGICAL BENCHMARK ELEVATIONS

Transect #	Edge of Water Elevation	High Vigor Low Marsh Low Point	High Vigor Low Marsh High Point	High Vigor High Marsh	Common Reed Lower Elevation
1	-0.70	0.83	1.12	1.24	1.12
2	-0.31	0.11	0.57	1.17	0.62
3	-0.18	0.67	0.71	1.26	1.01
4	0.19	0.42	0.87	1.28	1.43
5	-0.25	0.67	0.79	N/A	1.20
RANGE	-0.70 – 0.19	0.11 – 0.83	0.57 – 1.12	1.17 – 1.28	0.62 – 1.43
AVERAGE	-0.25	0.55	0.81	1.24	1.08
AVERAGE W/O OUTLIERS	N/A	0.65	0.74	N/A	N/A

Elevation in feet NAVD 88

8.3 Excavation and Grading

The initial phase of the proposed mitigation will involve the removal and stockpiling of topsoil from the northern third of the existing wetland and transition area. The soil associated with this portion of the site consists of a suitable sandy loam that will be used as topsoil for the proposed upland enhancement areas. This will be followed by bulk removal of soil throughout the wetland restoration areas beginning at the southwest terminus. The berms that are proposed for removal will be retained until internal grading is completed. Excavation equipment can then utilize the berms to access those that are to be removed. This will allow most of the construction to be accomplished without tidal inundation. Excess historic fill will be removed from the enhancement area and be placed in designated upland locations within the CBI Unit. Final grading will be performed prior to opening the site to tidal flows. It will be extremely critical to carefully monitor final grading since elevations that are too high will allow for invasion of the site by common reed while elevations that are too low will result in difficulties in establishing smooth cordgrass.

During grading, tidal channels will be cut into the enhancement area to allow the tide to enter the full extent of the site without the resistance that would occur if allowed to sheet flow. The tide will inundate the channel the entire length of the mitigation site and gradually overflow the banks of the channel as the tide rises. This will ensure that the entire site becomes inundated by the tide to establish both low and high marsh depending on final grade elevations. The proposed channel will be cut to an elevation of -0.3 feet North American Vertical Datum 1988 (NAVD 88) at its invert with a 3:1 side slope that flattens out at elevation 0.65 feet (NAVD 88). The invert of the channels will be

approximately three feet wide in the central portions of the mitigation site and then flare to as much as ten feet wide where the channels intersect with the bay. The 0.65-foot elevation will be carried out to the remaining enhanced low marsh area and should not deviate by more than 0.2 feet plus or minus. The north side of the central low marsh enhancement area will gently rise at a 10:1 slope to a maximum elevation of +1.25 feet (NAVD 88). This will transition from low marsh to high marsh habitat. The outer edges of the proposed high marsh will rise at a 10:1 slope for fifty feet to accommodate a transition area from wetland to upland. This transition area will likely have some common reed within it but this should be limited due to the salinity at lower elevations and shaded out by upland vegetation at higher elevations. Small pockets or ribbons of common reed will be unavoidable throughout the mitigation site; however, it is the common reed "farm" (i.e. that currently exists) that this project is trying to minimize.

8.4 Topsoil

The areas proposed to be constructed and enhanced as tidal saltmarsh will not require the placement of topsoil. E. Garbish (1993) has successfully used clean, medium sized sand as a planting substrate on 203 shoreline restoration projects. The high productivity of smooth cordgrass below ground results in a rapid increase in subsurface organic matter. The organic content in the soils builds rapidly as the marsh becomes established, and may dominate the composition of the substrate in several years. It is anticipated that the final grade cut within the proposed tidal marsh will expose a silt, sandy/silt, and/or silty/sand substrate with varying degrees of organic material associated with meadow mat. If solid silt is encountered at proposed elevations, these areas will be over excavated and backfilled with the suitable sandy loam topsoil that was stockpiled when excavation was started. There are no plans to import additional soil or any type of amendments for placement during final grading in areas below mean high water.

8.5 Invasive Controls

Common reed was the only invasive species identified onsite. Below is a description of the species along with management recommendations to control the species.

Both native and non-native (Haplotype M) forms of common reed occur in the United States. The native plant is considered rare by some researchers (Saltonstall et al 2005). The plant typically colonizes wetlands, marshes, floodplains, wet meadows, ditches, roadsides and disturbed areas and can tolerate brackish water. It can grow to 15 feet in height and quickly forms dense monocultures that inhibit plant and wildlife diversity. Stands of common reed pose a fire hazard. The seeds have a very low germination rate. Spread is often via plant stem or root tissue or the dense network of roots and aggressive rhizomes that will grow overland 30 feet or more in a single growing season. It is found in all 48 lower States. The plant does provide water quality treatment (Kiviat 2013). All wetlands associated with the mitigation project are dominated by common reed.

Common reed can be difficult to control. Small stands can be repeatedly mowed and disked and cut shoots should be carefully removed to prevent resprouting. Larger areas require repeated spraying

with herbicides (Imazapyr and/or Glyphosate) followed by mowing. Spraying is most effective when performed during the late summer/early fall season. Common reed may also be controlled by flooding for an extended period during the growing season.

In order to effectively eradicate and control the spread of invasive plant species, it is essential that treatment measures commence with the start of construction and continue through the maintenance and monitoring phase of the mitigation project. Multiple herbicide treatments are proposed to eradicate and control invasive species identified onsite. An initial herbicide application using Imazapyr and Glyphosate will be applied to all areas dominated by common reed approximately one year prior to grading. A subsequent treatment may be needed for total control throughout the treatment area. After grading occurs, spot treatment with Glyphosate may be needed to control sprouting individuals. All herbicides treatments will be applied by a New Jersey Certified Applicator.

8.6 Soil Erosion and Sediment Control

The project shall employ soil erosion and sediment control measures in accordance with the Natural Resources Conservation Service (NRCS) Soil Erosion and Sediment Control Standards (NJ Department of Agriculture. 2014) during the course of the construction of the project. Grading of the proposed creation and enhancement areas will be performed in the "dry" to the extent possible. In order to prevent scour of the channel banks, jute mesh will be placed in the channel as depicted on the mitigation plan details. In addition, a living shoreline is proposed along the banks of the channels for approximately 200 feet where the channels merge with Manahawkin Bay and West Thorofare. This living shoreline consists of two rows of coir logs along the mouth of each bank. The waterward set of logs' top elevation will rest at 0.2 feet NAVD 88 and the second row of logs' top elevation will rest at 0.65 feet NAVD 88. Both rows of logs will be planted with plugs of smooth cordgrass and seeded with transplanted ribbed mussels (*Mytilus edulis*).

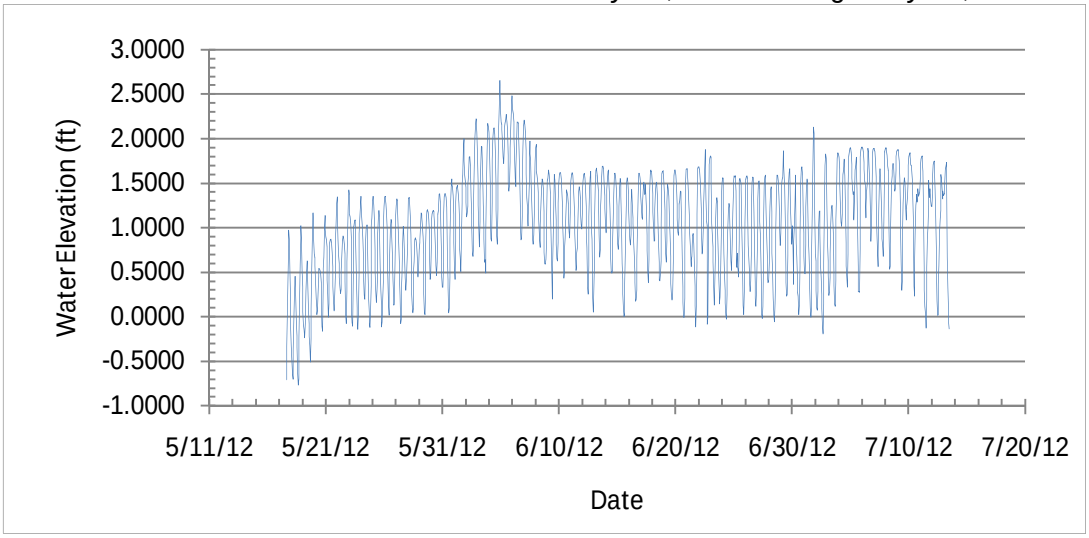
8.7 Hydrology

The proposed tidal saltmarsh will receive its hydrologic input from West Thorofare and Manahawkin Bay. The site will be graded to allow the tide to inundate the site on a twice-daily basis. Installation of a tide gauge as well as the establishment of biological benchmarks have provided the documentation necessary to achieve desired elevations and hydrology. A reliable source of hydrology is needed to support a saltmarsh community. In addition, the salinity and hydrology must be sufficient to prevent the re-establishment of common reed, which is presently located within the project area and which will be removed as part of the enhancement project. Common reed will not grow where the substrate is subject to submergence by tidal flooding. Mitigation design will subject both the creation and enhancement areas to tidal inundation.

Tidal elevations are extremely difficult to predict due to the variable distance between the earth and moon, gravitational interactions between the moon and the sun, and the revolution of the earth. The average interval between high and low tide is 12 hrs. 25.5 minutes; however, this interval can

vary by as little as 12 hours or as much as 14 hours. Specific tidal elevation data were collected from a tide gauge placed in Manahawkin Bay at the southeast corner of Cedar Bonnet Island. A second gauge was located just south of the mitigation site within a small tidal pool located within an existing high marsh. Data was collected on an hourly basis from May 17, 2012 through July 13, 2012. As illustrated in the following graph, mean high water was determined to be at elevation 1.55 feet, mean low tide was determined to be at elevation 0.39 feet, and the mid tide elevation was determined to be at elevation 0.97 feet. The spring high tide elevation was calculated to be +2.18 feet NAVD88 based upon local tide gauge information. The data collected from the tide gauge located in the tidal pool indicated that there was little to no tidal inundation occurring within the existing high marsh. The largest fluctuation in water level was approximately 7 inches, but the typical range was approximately 3 inches.

Fluctuation of Tidal Elevation Between May 17, 2012 through July 13, 2012



9. PLANTING PLAN

Detailed planting specifications are included in the mitigation plans (see Figure 16). The proposed areas to be planted include 7.84 acres of low marsh, 10.78 acres of high marsh, 5.05 acres of maritime shrub transition zone, 5.05 acres of maritime forest, 1.46 acres of shrub zone, and 5.41 acres of salt tolerant upland meadow. The following is a summary of each of these planting zones.

9.1 Intertidal / Subtidal Shallows

The project site will be planted to create a tidal saltmarsh located below mean high water. Low marsh will be planted entirely with smooth cordgrass, and high marsh will be planted with saltmeadow cordgrass and saltgrass. Planting will not occur within the tidal channel except on the coir logs located at the mouth of each tidal channel. Saltmarsh plants should be planted in the spring, between March and May, which is the optimal time of year for establishment. According to the Army Corps of Engineers (1982), the recommended spacing for planting smooth cordgrass is 3

Mitigation Summary Table			
Proposed Conditions	**Creation (Ac)**	**Restoration (Ac)**	**Total (Ac)**
Tidal Channel	1.618	0.000	1.618
Wetlands			
Low Marsh	7.836	0.000	7.836
High Marsh	10.780	0.000	10.780
Upland Habitat Restoration Area			
Forest	0.000	6.098	6.098
Shrub	0.000	1.455	1.455
Transit Shrub	0.000	5.051	5.051
Meadow	0.000	5.412	5.412
Other			
Upland Habitat Enhancement Area		5.441	5.441
Terrapin Nesting Area		1.393	1.393

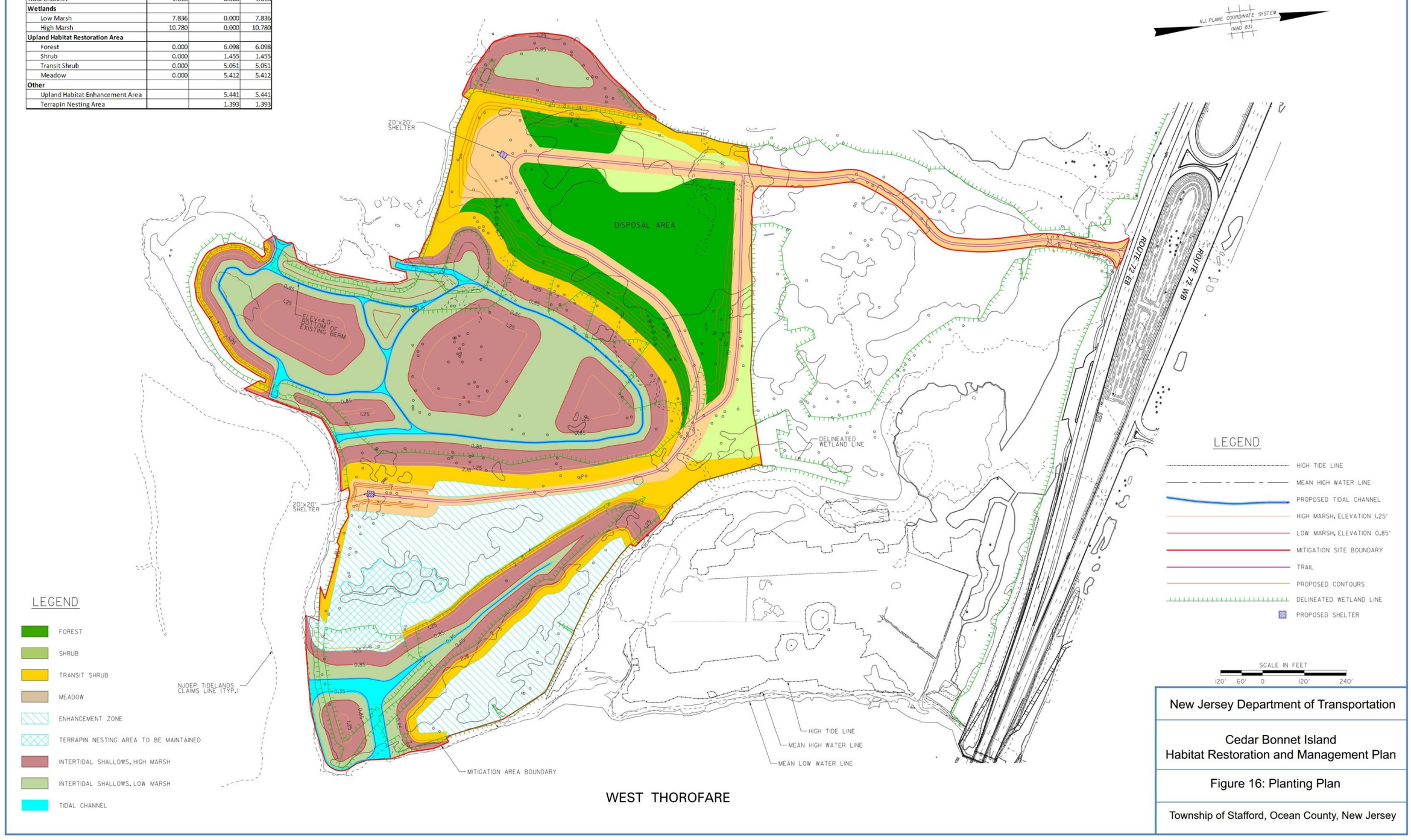


FIGURE 16: PLANTING PLAN

feet on-center for sheltered sites. Because the CBI Unit is only partially sheltered, planting will be spaced at 2 feet on-center. At this spacing, the site should be entirely colonized in two years or less. The proposed plants benefit from fertilization at the time of planting. A slow release fertilizer, such as thirty grams of an Osmocote 14-5.2-11.6, will be placed in each planting hole at the time of planting. Details regarding planting are included on the planting details in Appendix D.

TABLE 5: SALTMARSH EMERGENT PLANTINGS

Scientific Name	Common Name
Spartina alterniflora	Smooth Cordgrass
Spartina patens	Saltmeadow Cordgrass
Distichlis spicata	Saltgrass

9.2 Maritime Transition Shrub Community

Typically, a 50 foot zone of vegetation will be established within 50 feet of the upper wetland boundary that establishes a transition between the saltmarsh and the enhanced uplands. This transition zone will be graded at a 10:1 slope, and it will be heavily planted with salt tolerant shrubs (see Transition Zone Shrubs Table below). Shrubs will be planted at an average spacing of 8 feet on-center. Shrubs will be installed in a random pattern, with groups of similar species clustered together. The more salt tolerant plants, high tide bush and beach plum (Prunus maritime), should be concentrated closer to the wetland edge; whereas, ink berry (Ilex glabra) and northern bayberry (Myrica pensylvanica) should be concentrated closer to the upland edge. All of the selected species are native plants to Ocean County that will require no maintenance once established. Due to the large number of plants required, plants will need to be sourced out to 250 miles (typically) from the site. The plant diversity should, as the site matures, improve the value of the site to a variety of wildlife species.

TABLE 6: TRANSITION ZONE SHRUBS

Scientific Name	Common Name
Baccharis halimifolia	Groundsel Tree
Iva frutescens	High-Tide Bush
Prunus maritime	Beach Plum
Ilex glabra	Inkberry
Myrica pensylvanica	Northern Bayberry

9.3 Maritime Upland Forest

The following table includes the species of trees to be planted in the upland portions of the proposed forest mitigation area.

TABLE 7: MARITIME FOREST TREES

Scientific Name	Common Name
Amelanchier canadensis	Shadbush
Betula populifolia	Grey Birch
Carya tomentosa	Mockernut Hickory
Celtis occidentalis	Hackberry
Ilex opaca	American Holly
Juniperus virginiana	Eastern Red Cedar
Pinus rigida	Pitch Pine
Prunus serotina	Black Cherry
Quercus marilandica	Blackjack Oak
Quercus falcata	Southern Red Oak
Sassafras albidum	Sassafras

9.4 Maritime Scrub/Shrub Upland

The following table includes the species of shrubs to be planted in the upland portions of the proposed scrub/shrub mitigation area.

TABLE 8: MARITIME SCRUB/SHRUB ZONE

Scientific Name	Common Name
Aronia melanocarpa	Black Chokeberry
Baccharis halimifolia	Groundsel Tree
Ilex glabra	Inkberry
Myrica pensylvanica	Northern Bayberry
Rhus copallinum	Winged Sumac
Sambucus canadensis	Common Elderberry

9.5 Upland Meadow

The following seed mixes will be applied to the upland meadow portion of the enhancement area.

TABLE 9: UPLAND MEADOW SEED MIX

Scientific Name	Common Name
Carex vulpinoidea	Fox Sedge
Panicum clandestinum	Deer Tongue
Schizachyrium scoparium	Little Bluestem
Chamaecrista fasciculata	Partridge Pea
Elymus riparius	Riverbank Wild Rye
Elymus virginicus	Virginia Wild Rye
Verbena hastata	Blue Vervain
Andropogon gerardii	Big Bluestem
Heliopsis helianthoides	Ox Eye Sunflower
*Solidago sempervirens**	Seaside Goldenrod
*Solidago fistulosa**	Pine Barren goldenrod
Panicum virgatum	Switchgrass
Sorghastrum nutans	Indiangrass
Asclepias syriaca	Common Milkweed
Desmodium canadense	Showy Tick Trefoil
Eupatorium fistulosum	Joe Pye Weed
Eupatorium maculatum	Spotted Joe Pye Weed
Eupatorium perfoliatum	Boneset
Juncus effusus	Soft Rush
Monarda fistulosa	Wild Bergamot
Penstemon digitalis	Tall White Beard Tongue
*Echinacea purpurea**	Purple Coneflower
Rudbeckia hirta	Black Eyed Susan
Baptisia australis	Blue False Indigo
Euthamia graminifolia	Grass Leaved Goldenrod
Vernonia gigantea	Giant Ironweed

Planting of deciduous trees and shrubs will occur from September 1 to December 1 or March 1 to June 1. Shrub planting will only be performed when weather and soil conditions are suitable for optimal benefit to the plant. No trees or shrubs will be planted when the ground is frozen or in excessively moist conditions. Planting and fertilizing will be done according to contract specifications prepared specifically for this mitigation project.

10. PEST MANAGEMENT

In order to reduce the damage associated with Canada geese (*Branta canadensis*), herbivory fencing will be installed immediately following planting. The herbivory fence will be maintained for the duration of the first growing season. It is expected that the plants will be able to colonize the site during this initial growing season and will not require protection thereafter. The herbivory fencing will consist of goose fence along with string lines with reflective tape connected above the smooth cordgrass plantings (see photo). This type of control should discourage geese from accessing the mitigation area.

HERBIVORY FENCE

Invasive and/or exotic plant species will also be controlled during the monitoring period. The only invasive plant species potentially anticipated in the proposed wetland creation and enhancement areas is common reed. With proper grading, the site is expected to remain free of this plant species. Fall inspections will identify any areas of common reed and other non-native invasive species that might colonize the site. Routine maintenance to control this plant may include hand weeding if plant numbers are limited. A suitable herbicide will be applied by a certified herbicide applicator.

11. MAINTENANCE PLAN

Once suitable tidal inundation is established, the proposed mitigation should be self-sustaining. The continuous inundation of the mitigation site by saline water will inhibit the re-establishment of common reed. No other invasive species are anticipated to occur within this type of environment. The only maintenance issue may involve the removal of debris that threatens to impede tidal inundation.

12. PERFORMANCE STANDARDS

The proposed wetland creation and enhancement project will be deemed "successful" if, after a period of three years following completion of construction, the following has been achieved:

- The specified wetland mitigation area has been successfully converted from an existing degraded freshwater wetland dominated by common reed into a functioning low marsh wetland dominated by smooth cordgrass;
- The specified wetland mitigation area has been successfully converted from an existing degraded freshwater wetland dominated by common reed into a functioning high marsh wetland dominated by saltmeadow cordgrass;
- Tidal inundation of the site continues without impedance on a twice-daily basis.

A functioning site shall be achieved when:

- The site has an 85 percent survival and 85 percent area coverage of the mitigation planting or target hydrophytes;
- The site is less than 10 percent coverage by invasive or noxious species;
- The site contains hydric soils or there is evidence of reduction occurring in the soils; and,
- The proposed hydrologic regime as specified in the mitigation proposal has been satisfied.

13. MONITORING REQUIREMENTS

Monitoring will be performed in accordance with the NJDEP Checklist for Completeness for Mitigation Project Monitoring Reports for Coastal Wetlands, last revised January 2, 2013.

14. LONG-TERM MANAGEMENT PLAN

To ensure the long-term protection of the mitigation site, the Service will incorporate the site into their internal operations and maintenance plan. Only compatible uses of the site will be permitted, ensuring that long-term management through appropriate maintenance activities will occur. The only maintenance issues may involve the removal of debris that threatens to impede tidal inundation, mowing activities, pavilion and trail maintenance, and occasional herbicide applications as is currently carried out on the refuge. This can be accomplished by Service maintenance crews.

NJDOT will monitor the mitigation site in accordance with the permit conditions (5 years monitoring for wetland mitigation and 3 years monitoring for riparian zone mitigation). Additional long term monitoring, if any, will be the responsibility of the Service.

15. ADAPTIVE MANAGEMENT

Adaptive management refers to the development of a management strategy that anticipates likely challenges associated with the proposed wetland mitigation project and provides for the implementation of actions to address those challenges. A primary component of the adaptive management strategy is retention of institutional knowledge regarding the design and assumptions of the proposed wetland mitigation project. Therefore, to the fullest extent possible it is essential for the project designer to be involved in and supervise the construction, monitoring and maintenance of the proposed wetland mitigation project.

In general, the project will be inspected bi-annually throughout the monitoring period in order to identify any developing problems. As per the permit conditions, the NJDOT shall monitor the wetland mitigation for 5 full growing seasons beginning the year after the project has been completed. Additionally, the NJDOT shall also monitor the riparian mitigation for 3 years beginning the year after the project has been completed. Observed problems will be summarized in the

Annual Monitoring Report or Monitoring Memos. A standard inspection form will be developed for the project and will include documentation of the success of plantings (ex. percent survival and percent areal coverage), wildlife species observed, integrity of fencing, evidence of herbivory, evidence of vandalism, invasive species observed and other pertinent management data.

Invasive and/or exotic plant species will be controlled during the monitoring period. Invasive plant species anticipated in the proposed wetland mitigation site should be limited to common reed. Routine maintenance for control of unwanted plant species will be conducted twice during each growing season to ensure that these species do not become well established within the wetland mitigation project. The routine maintenance may include digging, pulling, and/or removing invasive plants from the wetland mitigation areas. A suitable herbicide treatment will be applied by a certified herbicide applicator.

16. INTERPRETIVE SIGNAGE AND WAYFINDING

Wayfinding is the art of using landmarks, signage, pathways and environmental cues to help visitors navigate and experience a site without confusion. The wayfinding experience is enhanced by placing interpretive signage, known as wayside exhibits, along the trails which provide a direct and meaningful connection between the visitors and the landscape. The intent of the wayside exhibit is to attract and focus attention on the site, not on the exhibit itself. The combination of observation areas, trails, and interpretive displays, will advance CCP Goal 4 Objectives 9(B) and 11(d) which are intended to increase wildlife observation and photography within the natural and human environment, and to provide environmental education and interpretation opportunities both on and off the Refuge, respectively.

16.1 Interpretive Sign Locations and Content

It is recommended that information be presented on the CBI Unit at five locations. The first interpretive display will be the Visitors Information Panel. This panel will be located on the east side of the trail head, at the entrance to the CBI Unit. The purpose of this display is to introduce and orient the visitor to the trail and other improvements on the CBI Unit. This display will include an overall map of the CBI Unit and act as a location key map, highlighting the locations of the trail and pavilion overlooks on the CBI Unit. See Figure 17.

The second interpretive display (see Figure 18) will overlook the site of a former structure locally known as The Shack. The main content of this display will deal with "Life on the Marsh," addressing in general terms the historic uses of the rich saltmarsh and estuary. There will be an inset on this display dealing specifically with The Shack, featuring a picture of the former structure. Featuring The Shack was suggested by the Mayors of Stafford and Ship Bottom Townships. The Shack, a former hunting and fishing cabin, was once located along the eastbound side of Route 72 in the marshes of Cedar Bonnet Island and served as the welcoming symbol to Long Beach Island. The Shack is no longer extant because it was demolished in Super Storm Sandy in October of 2012. "The Shack" was a locally identifiable structure associated with the "New Jersey Shore Experience".

The third interpretive display, the Habitat Restoration panel (see Figure 19), will be installed at the intersection of two trails in the refuge. This display will inform the visitor of the restoration effort and the ecosystem values being created. This display will also serve as the basis for the other two displays, one at each of the proposed observation pavilions. Each platform will include a pavilion style roofed structure, supported by posts, not enclosed by walls. This will provide rain and sun shelter for wildlife observation and photography.

The fourth interpretive display, the Cedar Bonnet Island Uplands panel (see Figure 20), which is proposed at the westerly observation pavilion, will target habitat values for upland migratory song birds. The display will provide photos of the birds with their common names. There will be a brief discussion of the habitat value for these birds. The westerly observation pavilion will be constructed atop the proposed fill area providing vistas of Beach Haven West, Long Beach Island and the Route 72 Causeway. It will also provide viewing to the natural marshlands to the south, and restored uplands to the north. The area around the overlook will be planted in grassland to preserve the viewsheds. See Upland Meadow Seed Mix table in Section 8.5 for species composition.

The final interpretive display, the Cedar Bonnet Island Coastal Marsh panel (see figure 21), will be located along the easterly observation pavilion. This pavilion will be constructed on a small fill within the former dredged material disposal site. This overlook will provide a more secluded opportunity to observe wading birds use of the restored coastal marsh as well as those to the south. The display will include photos of common wading birds likely to use the marshland like egrets, herons, ibises and shorebirds. These photos will include the common names of the representative shore birds.

FIGURE 17: VISITOR INFORMATION PANEL

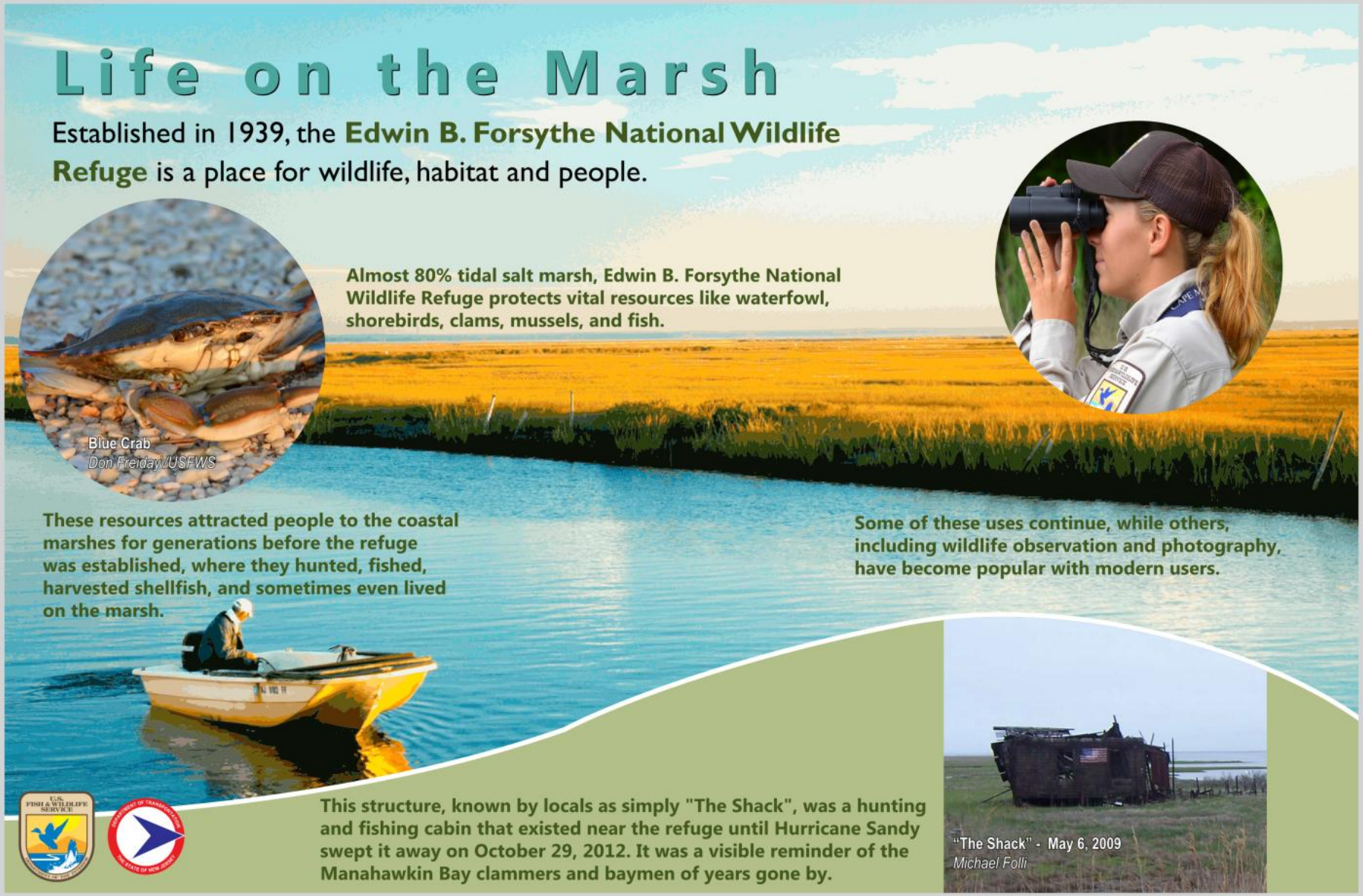


FIGURE 18: LIFE ON THE MARSH

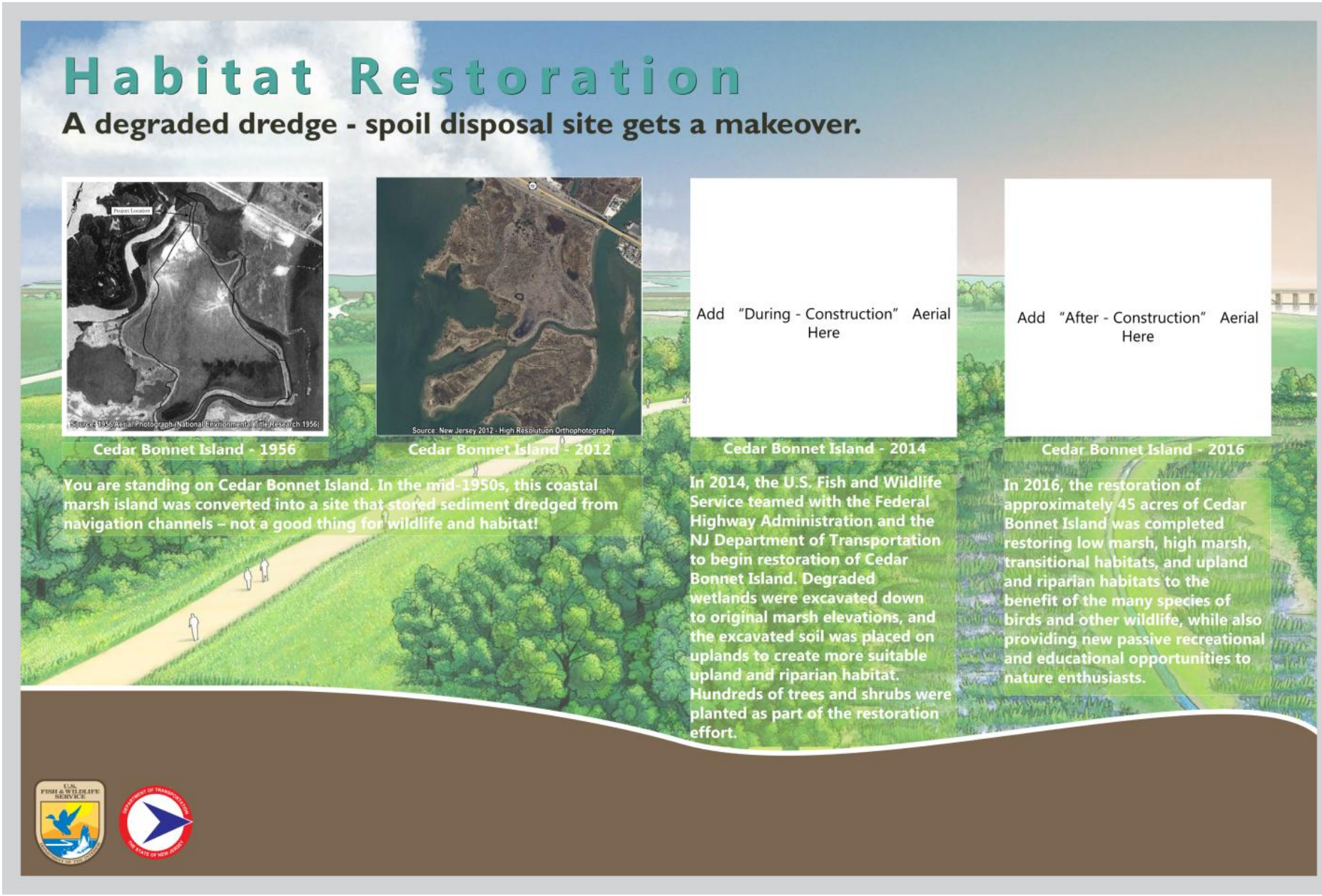


FIGURE 19: HABITAT RESTORATION

FIGURE 20: CEDAR BONNET ISLAND UPLANDS

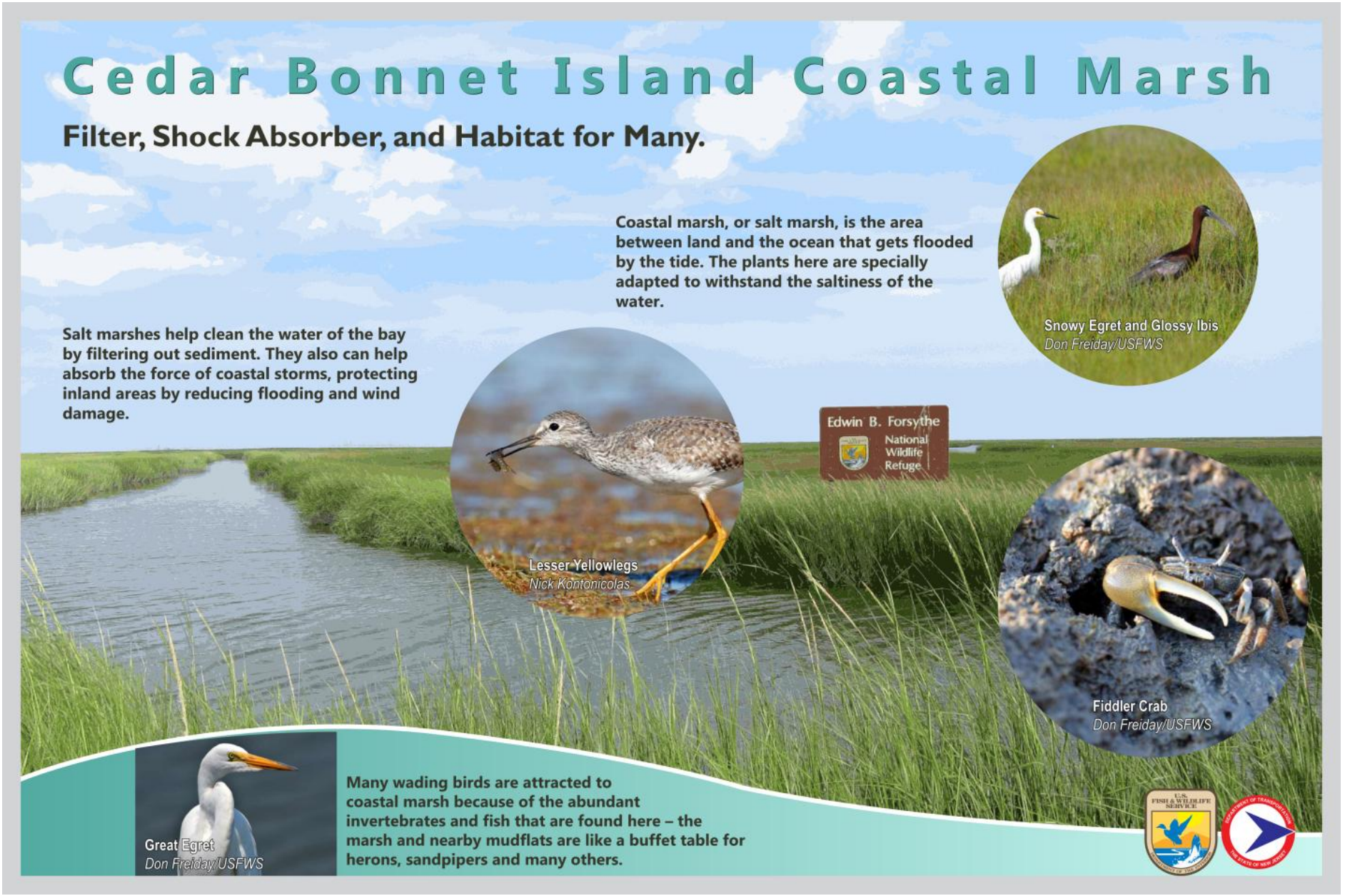


FIGURE 21: CEDAR BONNET COASTAL MARSH

16.2 Interpretive Signage Display Features

All interpretive displays will be designed in accordance with "Wayside Exhibits, A Guide to Developing Outdoor Interpretive Exhibits, National Park Service", October 2009, First Edition and approved by the Edwin B. Forsythe NWR. The panels will be constructed of durable material mounted in corrosion resistant frames. Upright frames will be approximately 36" by 48" in height. Low profile displays will be handicapped accessible and will be approximately 24" by 36" in dimension.

17. CUMULATIVE IMPACT ANALYSIS

This Habitat Restoration and Management Plan has been developed to address mitigation permit requirements of the NJDOT Route 72 Manahawkin Bay Bridges Project which consists of the construction of a new bay bridge parallel to the existing bay bridge, rehabilitation of the existing bay bridge, rehabilitation of the three trestle bridges, and associated Route 72 roadway widening. Route 72 has limited access with minimal remaining developable property adjacent to it on CBI, the majority of which is owned by the Service and NJDOT. As such, there is minimal potential for this project to induce future development on the lands surrounding the CBI Unit.

The actions of the Preferred Alternative would have no substantial adverse impacts on the adjacent land use or adjacent natural resources. When considered with other unrelated activities that are being planned in the same vicinity or within a similar time frame, the Preferred Alternative is not anticipated to have adverse cumulative effects. Direct and indirect beneficial cumulative impacts are anticipated through the long-term benefits to fish and wildlife within and adjacent to the project site. Direct and indirect adverse cumulative impacts of the Preferred Alternative would be short-term only as it would occur only during the construction period and would be localized. These impacts would be a result of construction and excavation activities and would result in temporary visual impacts due to the presence of construction on the project site, temporary loss or disturbance of vegetation, and temporary impacts to wildlife due to construction noise and land disturbance.

Additionally, the NJDOT Route 72 Manahawkin Bay Bridges Project is providing new public access areas along the Route 72 project corridor, including a parking area within NJDOT's Route 72 Eastbound right-of-way near the CBI Unit entrance. This parking area will provide a safe haven for visitors of the CBI Unit to park; however, this parking area will be limited to only 14 parking spaces which would limit those opportunities at one time to minimize disturbance to wildlife.

For these reasons, as well as that the CBI Unit is protected in perpetuity as part of the Refuge and will remain secluded along a portion of Route 72 that has limited access, there would be no substantial adverse cumulative impacts due to implementation of this Habitat Restoration and Management Plan.

18. PERMITS

The project area overlaps several jurisdictional areas with regard to wetlands and open waters. The entire project area is located within the jurisdiction of the USACE pursuant to Section 404 of the Clean Water Act. The project area also contains a fringe of coastal wetlands that were mapped pursuant to the New Jersey Wetlands Act of 1970; therefore, the proposed project must comply with the New Jersey Coastal Permit Program Rules (N.J.A.C. 7:7). NJDEP retains jurisdiction over wetlands, open waters, and intertidal/subtidal shallows where they occur below the Spring High Water elevation.

A NJDEP permit for the NJDOT Route 72 Manahawkin Bay Bridges Project was issued on October 26, 2012 (NJDEP Permit Number 1500-10-0002.1) (Appendix G). This permit included the Coastal Area Facility Review Act (CAFRA) Individual Permit, Waterfront Development In-water and Upland Individual Permits, Coastal Wetlands Permit, and Coastal Zone Consistency Determination approvals in accordance with the NJDEP Coastal Permit Program Rules (N.J.A.C. 7:7); and a Freshwater Wetland Individual Permit and Water Quality Certificate approvals in accordance with the Freshwater Wetland Protection Act Rules (N.J.A.C. 7:7A). In addition, the riparian zone requirements of the NJDEP Flood Hazard Area Control Act Rules (N.J.A.C. 7:13) were addressed as part of the statement of compliance with the Coastal Zone Management Rules (N.J.A.C. 7:7E). For this CBI Unit mitigation project, the NJDEP will also require a NJDEP Coastal General Permit #29 for "Habitat Creation, Restoration, Enhancement, and Living Shoreline Activities".

A USACE Section 404 permit for the NJDOT Route 72 Manahawkin Bay Bridges Project was issued on January 17, 2013 (CENAP-OP-R-2012-328-35) (Appendix H). Although the Conceptual Mitigation Plan was reviewed as part of the Section 404 application process, the USACE will require a modification of the existing Section 404 permit to include the final mitigation plans for the CBI mitigation project.

Additionally, for construction of this mitigation project, a Special Use Permit will be required from the Service and a Soil Erosion & Sediment Control Self-Certification will be required from the NJDOT.

19. CONSULTATION AND COORDINATION WITH THE AGENCIES, PUBLIC AND OTHERS

The following activities indicate consultation and coordination efforts regarding this CBI Unit mitigation project:

TABLE 10: AGENCY MEETINGS

Meeting	Date
Route 72 Interagency Meeting - NJDOT Offices	3/22/12
NWR CBI Mitigation Procedural Meeting - USFWS Headquarters	6/7/12
NWR CBI Mitigation Procedural Meeting - USFWS Headquarters	7/13/12
NWR CBI Mitigation Procedural Meeting - USFWS Headquarters	10/24/2012
NWR CBI Mitigation Procedural Meeting - USFWS Headquarters	1/8/2013
NWR CBI Mitigation Agency Meeting - NJDOT Offices	2/13/2013
NWR CBI Stakeholder Meeting - Stafford Township	3/20/2013
Public Information Center - Surf City Fire Department	5/16/2013
Public Information Center - Stafford Township Municipal Building	5/23/2013
NWR CBI Mitigation Procedural Meeting - USFWS Headquarters	8/5/2013
NWR CBI Mitigation Procedural Meeting - USFWS Headquarters	12/3/13

20. REFERENCES

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Walsh, J., V. Elia, R. Kane, and T. Halliwell. 1999. Birds of New Jersey. New Jersey Audubon Society, Bernardsville, NJ. 704 pp.

21. LIST OF PREPARERS

United States Fish and Wildlife Service, Edwin B. Forsythe NWR

Virginia Rettig	Refuge Manager
Vinny Turner	Wildlife Biologist
Donald Freiday	Visitor Services Manager
William Crouch	Coastal Wetlands Biologist

New Jersey Department of Transportation

Pankesh Patel, PE	Project Manager
Bruce Hawkinson	Section Chief, Environmental Project Manager
Tina Shutz	Principle Environmental Specialist
Scott Ackerman	Senior Environmental Specialist

Parsons Brinckerhoff

Joseph Mumber, P.E.	Project Manager
Steven Balzano	Environmental Manager
Michael Folli	Lead Environmental Scientist
Ebony Washington	Environmental Scientist II

Appendix A

Project Correspondence

State of New Jersey

DEPARTMENT OF TRANSPORTATION
P.O. BOX 600
TRENTON, NJ 08625-0600

CHRIS CHRISTIE
Governor

KIM GUADAGNO
Lt. Governor

JAMES S. SIMPSON
Commissioner

Route 72 Manahawkin Bay Bridge Project
(St. Nos. 1513151 through 154):
Continuing Section 106 Consultation Comments
Township of Stafford and Borough of Ship Bottom
Ocean County
NJDOT # 1513513
Log # 05-0794-01 through 07

November 16, 2012

Mr. Daniel D. Saunders
Deputy State Historic Preservation Officer
Mail Code 501-04B
NJDEP Historic Preservation Office
PO Box 420
Trenton, NJ 08625-0420

05-0794-8-VM
HPO-K2012-107

Attn: Vincent Maresca

Dear Mr. Saunders:

The purpose of this letter is to continue the Section 106 consultation process for the above-referenced project. On March 24, 2006, December 29, 2009, August 27, 2010, and November 16, 2012 (HPO Log # 05-0794-01 through 07), you rendered opinions that no historic properties would be affected by the proposed undertakings.

As the project has advanced and impacted natural resources have been identified, the New Jersey Department of Transportation (NJDOT) and the Federal Highway Administration (FHWA) have entered into the environmental permitting process. The NJDOT proposes to perform environmental mitigation on Cedar Bonnet Island, which is located south of the eastbound lane of Rt. 72. The Cedar Bonnet Island (or CBI) Unit of the Edwin B. Forsythe National Wildlife Refuge is under the management of the US Fish and Wildlife Service (USFWS). Portions of CBI were surveyed as part of the project's Area of Potential Effect (APE) for subsurface and standing structures in 2006 by URS, Inc. and, again, in 2009 by Richard Grubb & Associates, Inc. As a result of those efforts, no historic properties were located. The enclosed report expands the Area of Potential Effects (APE) to include portions of the USFWS's refuge on CBI that will be used for mitigation.

Enclosed for your review is the **Cultural Resources Screening: Route 72 Manahawkin Bay Bridges, Edwin B. Forsythe National Wildlife Refuge, Cedar Bonnet Island Unit, Stafford Township, Ocean County, New Jersey** prepared by Richard Grubb & Associates, Inc. on November 16, 2012 for Parsons Brinckerhoff, Inc. (Please note that the use of the term "Screening" is based on the Parsons Brinckerhoff's contractual terminology with Grubb; in cultural resources parlance, the document is a "Survey.")

Therefore, per 36CFR800.3, we are enlarging the APE and identifying historic properties which may lie within the APE. Additionally, per 36CFR800.4 and .5, we are assessing the effects of the actions associated with the environmental mitigation.

05-0794-8
HPO-K2012-107

SUMMARY: *The New Jersey Department of Transportation seeks your concurrence that there are no historic properties affected by the addition, to the above referenced project, of the proposed mitigation on the Cedar Bonnet Island Unit of the Edwin B. Forsythe National Wildlife Refuge.*

Introduction

The Section 106 regulations allow for a level of effort for conducting and evaluating cultural resources to be commensurate with the undertaking. The undertaking proposes restoration of a portion of Cedar Bonnet Island which is under the jurisdiction of the US Fish and Wildlife Service (USFWS).

All cultural resources work was conducted in compliance with the requirements of Section 106 of the National Historic Preservation Act of 1966 (as amended), implemented by the regulations described in 36CFR800, and in accordance with the provisions of the Programmatic Agreement executed in November 1996.

Project Description and Delineation of the Area of Potential Effects (36CFR800.3)

The New Jersey Department of Transportation is proposing to mitigate for the loss of intertidal/subtidal shallows and riparian zones associated with the bridge replacement project on CBI. In addition, a parking lot, walking trails, and viewing platforms will be constructed. The mitigation site is located on the Cedar Bonnet Island Unit of the Edwin B. Forsythe National Wildlife Refuge which is under the management of the US Fish and Wildlife Service (USFWS).

Currently, the area in question has been utilized as a dredge disposal site since, at least, the mid-1950s. This use has degraded the natural features of this tidal marsh island. Mitigation proposes to restore those features.

Identification of Historic Properties (36CFR800.4) and Assessment of Effects (36CFR800.5)

The geomorphological study indicates that Cedar Bonnet Island developed on accumulated sediments in the back bay rather than as a submerged upland. The results of the borings support the dynamics of coastal processes on this landform. As such, the potential for intact cultural resources to be impacted by the proposed restoration is low. The restoration proposes to remove the dredge spoils and grade the area to create hospitable habitat. The deepest excavation will be for a mostly recreated, as indicated by historic charts and maps, tidal channel.

As a side note, the locally significant "Old Shack," i.e. the Happy Days Gunning Shack, which was surveyed by URS in 2006 and found ineligible by the SHPO, was destroyed by Sandy in October 2012.

The NJDOT believes that this Level of Effort is one of a *reasonable and good faith effort to carry out appropriate identification efforts* as stated in 36CFR800.4(b)(1). The area was subjected to a geomorphological study; the professional opinion is that the lack of surface or subsurface horizons below the historic marsh indicate the island formed through sediment accumulation; based on the dynamic processes associated with this formation and location, the potential for significant cultural resources to exist is low.

Please indicate your opinion regarding the proposed projects on the line provided. Thank you for your prompt response.

Very truly yours,

Janet A. Fittipaldi
Manager
Bureau of Landscape Architecture and Environmental Solutions

Kew:rt72bbcbi

enclosure

05-0794-8
HPO-K2012-107

cc: S. Ackerman — *Environmental Solutions* — *w/o enclosure*
A. Sabidussi — *FHWA* — "
M. Hayduk — *Army Corps of Engineers* — "

_____ I concur with the finding that no historic properties will be affected by the Cedar Bonnet Island mitigation proposal within the project's Area of Potential Effects. Consequently, pursuant to 36 CFR 800.4(d)(1), no further Section 106 consultation is required unless additional resources are discovered during project implementation pursuant to 36 CFR 800.13.

_____ My opinion differs from the above for the following reasons:

Signed _____ Date 11/16/12

Daniel Saunders
Deputy State Historic Preservation Officer

C. MIKE HAYDUK, U.S. ARMY CORPS OF ENG.

Department of the Interior
United States Fish and Wildlife Service
Edwin B. Forsythe National Wildlife Refuge
800 Great Creek Road
P. O. Box 72
Oceanville, New Jersey 08231-0072

July 27, 2012

Mr. Bruce Hawkinson
Environmental Project Manager
New Jersey Department of Transportation
Post Office Box 600
1035 Parkway Avenue
Trenton, NJ 08625

Dear Mr. Hawkinson:

I am writing this letter to confirm our interest in participating in a mitigation project on Edwin B. Forsythe National Wildlife Refuge (Refuge), which is administered by the U.S. Fish and Wildlife Service (Service). That project has been developed with previous and current refuge management over the last few years to meet New Jersey Department of Environmental Protection (NJDEP) mitigation requirements for the re-construction of the U.S. Highway 72 Bay Bridges by your organization. The Highway 72 right-of-way is immediately adjacent to a portion of the Refuge referred to as Cedar Bonnet Island in Ocean County, NJ.

The concept of conducting a comprehensive habitat restoration project on the Refuge was presented to me in January 2012 by one of the consulting firms working on the project. I, in turn, presented the concept to the Service's Northeast Regional Office who granted permission to me to work on the project. Since then, members of my staff and the staffs of NJDOT, NJDEP, and several consulting firms have been working together to draft plans and maps to meet the goals of the State's mitigation requirements resulting from construction project impacts.

While the project will be conducted on Refuge land, it is most appropriate for your Agency to remain the party responsible for meeting all permit requirements, including any performance measures established for work conducted on Refuge property. By permitting the subject mitigation on Refuge property, we are not assuming any liability for permit requirements, or any phase of project implementation.

Progress has been excellent and I am looking forward to finalizing the plans to restore several habitat types and public use to the Cedar Bonnet Island area. Feel free to contact me any time

regarding this project at 609/652-1665.

Sincerely,

Virginia Rettig
Refuge Manager

Cc: NJFO, Pleasantville, NJ

Appendix B

USFWS Natural Resources of Concern: iPac Species Screening

U.S. Fish and Wildlife Service

Natural Resources of Concern

This resource list is to be used for planning purposes only — it is not an official species list.

Endangered Species Act species list information for your project is available online and listed below for the following FWS Field Offices:

NEW JERSEY ECOLOGICAL SERVICES FIELD OFFICE
927 NORTH MAIN STREET, BUILDING D
PLEASANTVILLE, NJ 08232
(609) 646-9310
http://www.fws.gov/northeast/njfieldoffice/Endangered/consultation.html

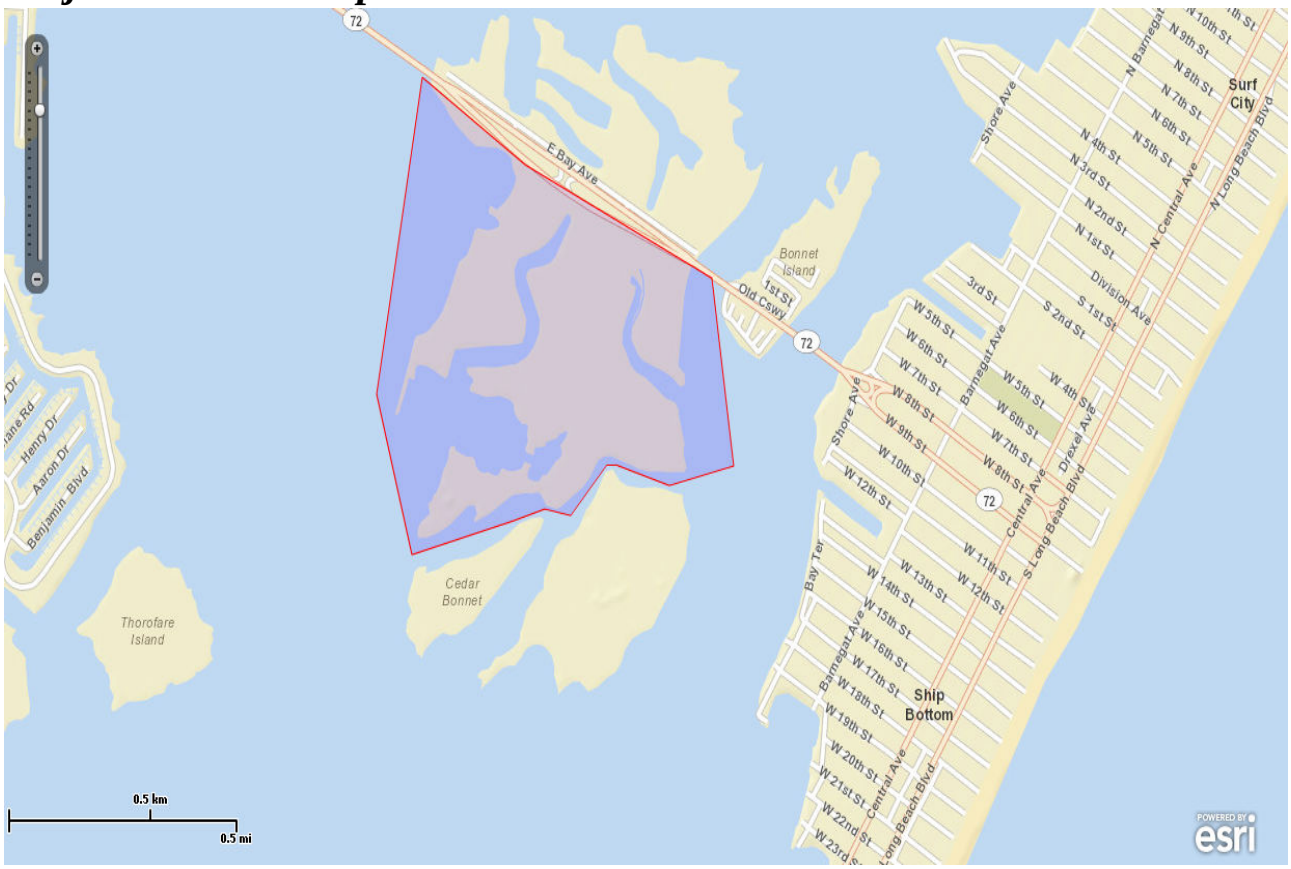
Project Name:

CBI Mitigation

U.S. Fish and Wildlife Service

Natural Resources of Concern

Project Location Map:



Project Counties:

Ocean, NJ

Geographic coordinates (Open Geospatial Consortium Well-Known Text, NAD83):

MULTIPOLYGON (((-74.2021542 39.6489539, -74.2036159 39.6530215, -74.2017255 39.6610484, -74.1974769 39.6588332, -74.1897521 39.6559604, -74.1888509 39.6512009, -74.1915116 39.6507052, -74.1937432 39.6512339, -74.1940866 39.6512339, -74.1955886 39.6499452, -74.1966681 39.6501105, -74.1979485 39.6498131, -74.2021542 39.6489539)))

Project Type:

Land - Restoration / Enhancement

U.S. Fish and Wildlife Service

Natural Resources of Concern

Endangered Species Act Species List (USFWS Endangered Species Program).

There are a total of **4** threatened, endangered, or candidate species, and/or designated critical habitat on your species list. Species on this list are the species that may be affected by your project and could include species that exist in another geographic area. For example, certain fishes may appear on the species list because a project could cause downstream effects on the species. Please contact the designated FWS office if you have questions.

Species that may be affected by your project:

Birds	Status	Species Profile	Contact
Piping Plover (*Charadrius melodus*) Population: except Great Lakes watershed	Threatened	species info	New Jersey Ecological Services Field Office
Flowering Plants			
Bog Asphodel (*Narthecium americanum*)	Candidate	species info	New Jersey Ecological Services Field Office
Knieskern's Beaked-rush (*Rhynchospora knieskernii*)	Threatened	species info	New Jersey Ecological Services Field Office
Swamp pink (*Helonias bullata*)	Threatened	species info	New Jersey Ecological Services Field Office

FWS National Wildlife Refuges (USFWS National Wildlife Refuges Program).

There are **1** refuges in your refuge list

Edwin B. Forsythe National Wildlife Refuge (609) 652-1665 GREAT CREEK ROAD, BOX 72 OCEANVILLE, NJ08231	refuge profile

FWS Migratory Birds (USFWS Migratory Bird Program).

Most species of birds, including eagles and other raptors, are protected under the Migratory Bird Treaty Act (16 U.S.C. 703). Bald eagles and golden eagles receive additional protection under the Bald and Golden Eagle Protection Act (16 U.S.C. 668). The Service's Birds of Conservation Concern (2008) report identifies species, subspecies, and populations of all migratory nongame birds that, without additional

conservation actions, are likely to become listed under the Endangered Species Act as amended (16 U.S.C 1531 et seq.).

NWI Wetlands (USFWS National Wetlands Inventory).

The U.S. Fish and Wildlife Service is the principal Federal agency that provides information on the extent and status of wetlands in the U.S., via the National Wetlands Inventory Program (NWI). In addition to impacts to wetlands within your immediate project area, wetlands outside of your project area may need to be considered in any evaluation of project impacts, due to the hydrologic nature of wetlands (for example, project activities may affect local hydrology within, and outside of, your immediate project area). It may be helpful to refer to the USFWS National Wetland Inventory website. The designated FWS office can also assist you. Impacts to wetlands and other aquatic habitats from your project may be subject to regulation under Section 404 of the Clean Water Act, or other State/Federal Statutes. Project Proponents should discuss the relationship of these requirements to their project with the Regulatory Program of the appropriate U.S. Army Corps of Engineers District.

Appendix C

USFWS Standard No Effect Determination

United States Department of the Interior

FISH AND WILDLIFE SERVICE

New Jersey Field Office
927 North Main Street, Building D
Pleasantville, New Jersey 08232
Tel: 609-646-9310 Fax: 609-646-0352
http://www.fws.gov/northeast/njfieldoffice

March 10, 2009

To Whom It May Concern:

Section 7(a)(2) of the Endangered Species Act (ESA) requires Federal agencies to consult with the U.S. Fish and Wildlife Service (Service) to ensure that actions they fund, authorize, permit or otherwise carry out will not jeopardize the continued existence of any listed species or adversely modify designated critical habitats. Federal agencies must initiate consultation with the Service if a proposed action *may affect* one or more listed species. In addition, the Service provides review of non-Federal actions that *may affect* federally listed species or their habitats as technical assistance to help non-Federal project proponents ensure compliance with the ESA and with New Jersey land use regulations. Staffing constraints currently limit the Service's New Jersey Field Office to reviewing only those projects that *may affect* federally listed species. The *may affect* determination is made by the Federal action agency or non-Federal project proponent using the information and instructions on our web site.

http://www.fws.gov/northeast/njfieldoffice/Endangered/consultation.html

Federal agencies are not required to contact the Service if a proposed action will have *no effect* on listed species, or if no listed species are present in the action area. No further ESA consultation or coordination is necessary for projects where the Federal action agency or non-Federal project proponent has followed the procedures on our web site and determined that proposed project activities will have *no effect* on federally listed species. Service concurrence with a *no effect* determination is not required under the ESA and will not be provided by the New Jersey Field Office. In addition to this letter, the Federal action agency or non-Federal project proponent should retain in their paper files documentation from our web site at the time of their review, including the relevant portion(s) of the *Federally Listed and Candidate Species Occurrences in New Jersey by County and Municipality*. Note that under the ESA, a species list is valid for only 90 days; the Service recommends consulting our web site regularly during project planning and implementation for updated species lists and information.

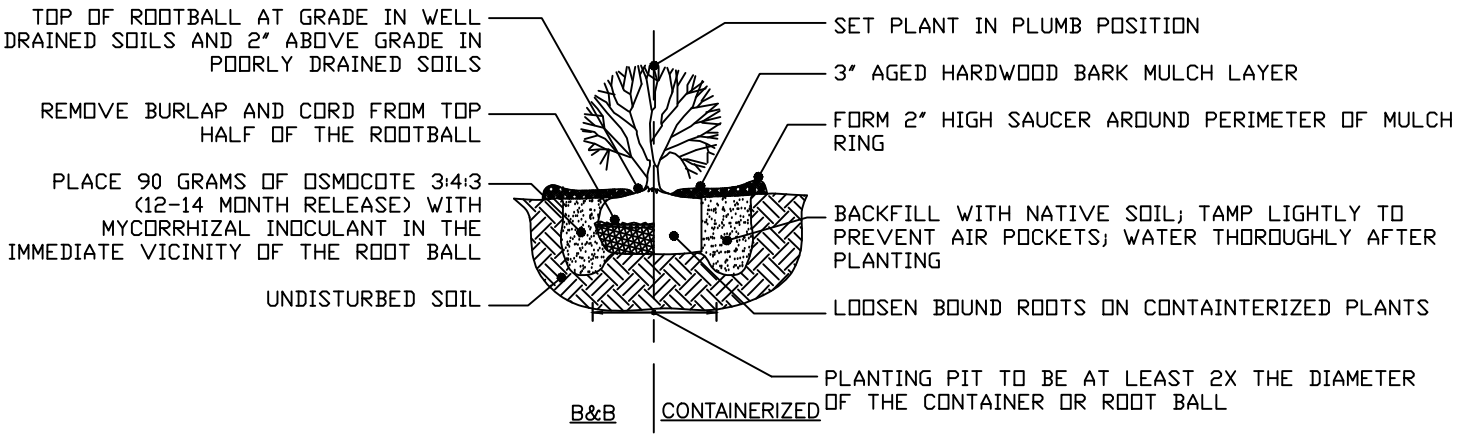
Thank you for your cooperation. Please contact Wendy Walsh at (609) 383-3938, extension 48, if you have any questions or require further assistance regarding federally listed threatened or endangered species.

Sincerely,

J Eric Davis Jr.
Supervisor

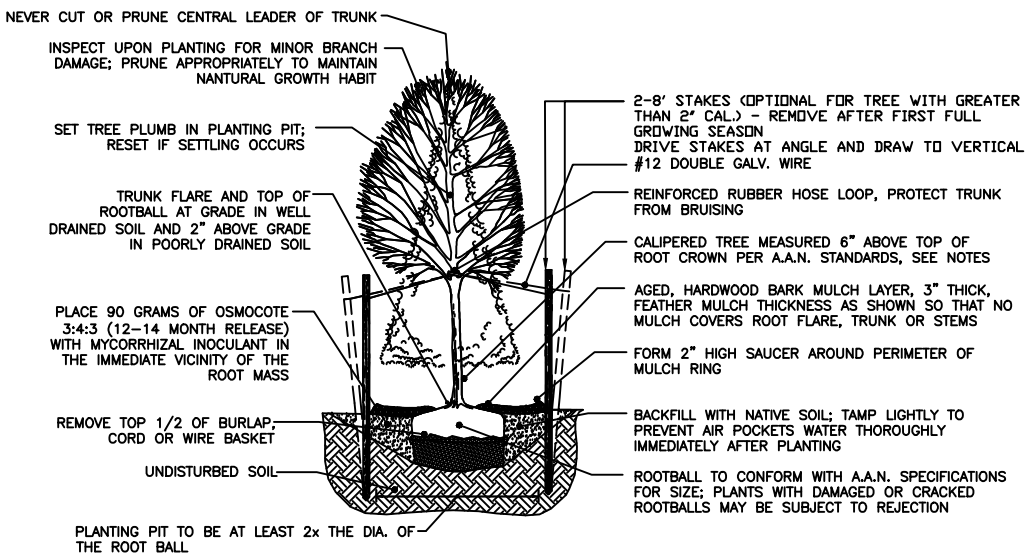
Appendix D

Planting Details



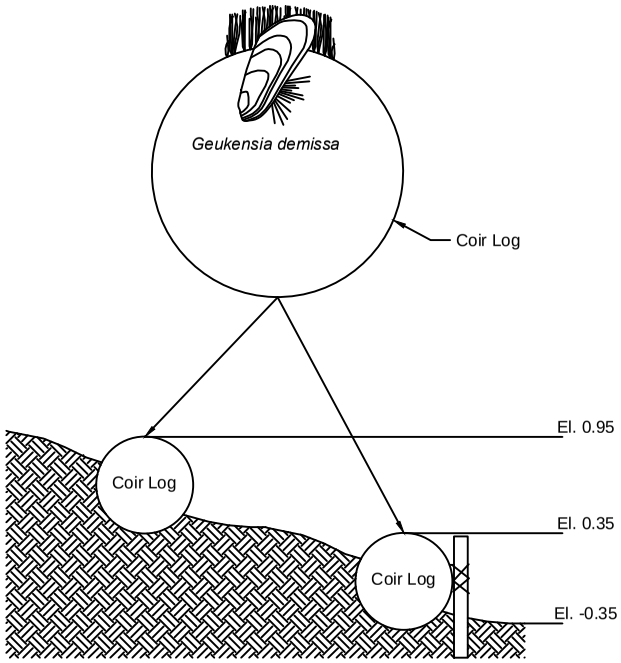
SHRUB PLANTING B&B AND CONTAINERIZED

N.T.S.



B&B TREE PLANTING DETAIL

N.T.S.


Geukensia demissa
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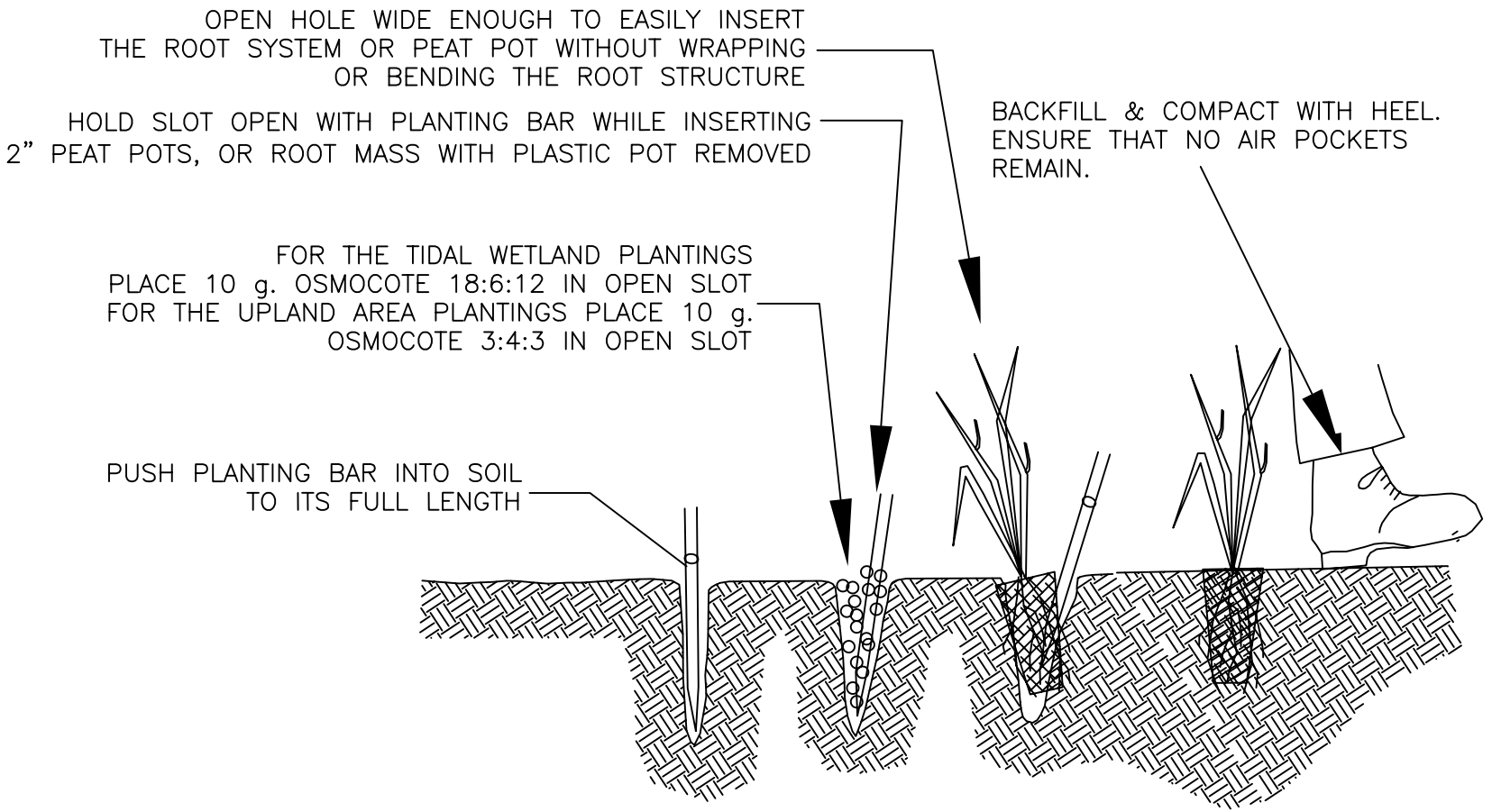
Coir Log
El. -0.35

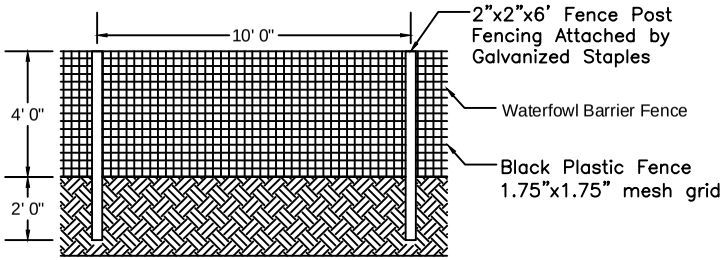


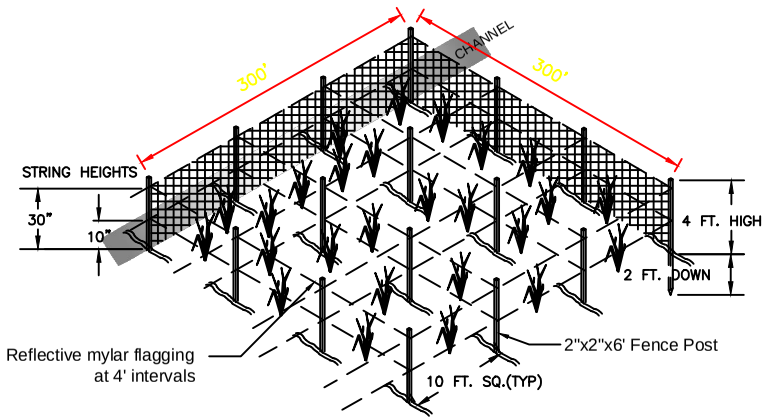
HERBACEOUS PLANTING INSTALLATION DETAIL (TYP.)

NOT TO SCALE

WATERFOWL FENCING NOTES:

1. Perimeter of wetland shall be encircled with waterfowl barrier fence, as seen below.
2. Additional barrier fencing at intervals of 300' and along channels - top of bank - where applicable.
3. Interior 2" x 2" x 6' untreated hardwood posts shall be placed at 10' intervals.
4. Two sets of nylon string shall be tied to every post in intersects.
5. Install 4' high black plastic fencing around perimeter posts.
6. Fencing shall be trenched in at least 6" as mammal deterrent.
7. Mount fencing to posts using galvanized staples.
8. Mount nylon string atop posts in pattern indicated in the barrier cell detail.
9. Tie 12" reflective mylar flagging on nylon string at 4' intervals.

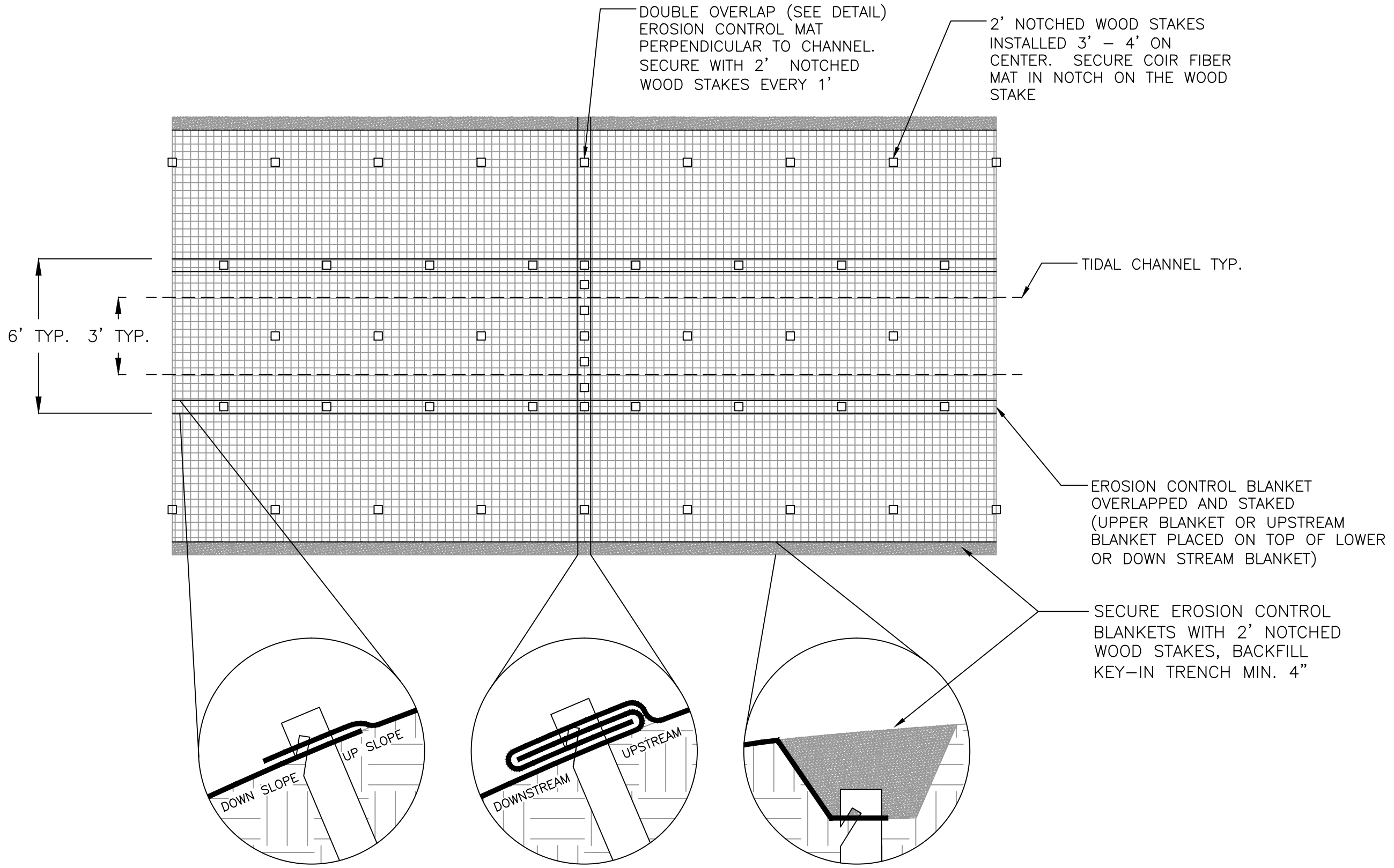




WATERFOWL PROTECTION

DETAIL E

NOT TO SCALE –



TIDAL CHANNEL COIR FIBER EROSION CONTROL MAT INSTALLATION (PLAN VIEW – TYPICAL)

N.T.S

Appendix E

Mitigation Project Monitoring Reports for

Coastal Wetlands Checklist

State of New Jersey
DEPARTMENT OF ENVIRONMENTAL PROTECTION
CHRIS CHRISTIE
Governor
Division of Land Use Regulation
Mail Code 501-02A, P.O. Box 420, Trenton, NJ 08625-0420
Fax # (609) 292-5399
KIM GUADAGNO
Lt. Governor
www.state.nj.us/dep/landuse
BOB MARTIN
Commissioner

MITIGATION PROJECT MONITORING REPORTS FOR COASTAL WETLANDS

CHECKLIST FOR COMPLETENESS

All mitigation sites must be monitored starting the first full growing season after the construction/planting of the mitigation project is completed. The mitigation project must be monitored for three **full** growing seasons. Below are the submission requirements for a complete monitoring report. Please read each section and check each area after you have fully completed the information for each applicable requirement.

Section A: All monitoring reports must include five copies of the following information

1. A USGS quad map, and a county road map showing the location of the mitigation site, including the lot and block of the mitigation site. Furthermore provide a copy of an aerial photograph of the mitigation site. This information must clearly indicate the point(s) of access to the mitigation site.

2. A copy of the permit that required the mitigation.

3. A brief description of the mitigation project.

4. Photographs of the mitigation site with a location map indicating where they were taken on the site.

5. An assessment of the planted vegetation as well as the species that are naturally colonizing the site. This assessment shall include the location and percent coverage of each species.

6. Documentation demonstrating that the hydrologic regime specified in the mitigation proposal, which proves the mitigation site is a wetland, is present. The documentation shall include, as appropriate, monitoring well data, stream gauge data, photographs and/or field observation notes collected throughout the monitoring period.

7. Data sheets from sampling points, which describe the vegetation present, the percent coverage of the vegetation, soil borings and location of the water table.

8. Documentation, based on field data, that the goals of the wetland mitigation project (including the transition area) as stated in the approved wetland mitigation proposal will be satisfied.

9. A narrative evaluating the success/failure of the site.

10. If problems with the site are identified, identify actions that should be taken which will permanently rectify the situation.

Section B: In addition to the information required in Section A above, all successful first full growing season monitoring reports must include the following information. If any one or more of the below listed parameters are not met then this full growing season monitoring period must be repeated until satisfied.

1. Documentation that demonstrates through soil borings that the appropriate soil was used on the site as indicated in the mitigation approval.

2. As built plans, which demonstrate that the site was graded and planted in accordance with the approved mitigation plans. Any deviations from the approved mitigation plans must be highlighted and explained to the Program for review and approval.

3. Documentation that the hydrologic regime specified in the approved mitigation proposal, which proves the mitigation site is a wetland, appears to be present. Any deviations from the approved proposal must be highlighted and explained to the Program for review and approval.

4. Documentation that demonstrates that there is at least 30% areal coverage of the planted vegetation or target hydrophytes which are species native to the area and similar to ones identified on the mitigation planting plan.

5. Documentation that demonstrates less than 10 percent of the site is occupied by invasive or noxious species such as but not limited to: *Acer platanoides* (Norway Maple), *Ailanthus altissima,* (Tree of Heaven), *Allaria petiole* (Garlic mustard), *Ampelopsis brevipedunculata* (Porecelain berry), Artemisia biennis (Biennial wormwood) *Artemisia vulgaris* (Mugwort or Common wormwood), *Berberis thunbergii* (Japanese barberry), *Berberis vulgaris* (Common barberry*), Carex kobomugi* (Japanese sedge), *Celastrus orbiculatus* (Asian Bittersweet), *Centaurea biebersteiniior maculosa* (Spotted knapweed), *Cirsium arvense* (Canadian thistle), *Dipsacus fillonum* (Wild teasel), *Dipsacus laciniatus* (Cut-leaf teasel), *Elaegnus angustifolia* (Russian olive), *Elaegnus umbellata* (Autumn olive), *Euonymus alata* (Winged spindletree), *Lespedeza cuneata* (Chinese bush-clover), *Ligustrum obtusifolium* (Japanese privet), *Ligustrum vulgare* (Common privet), *Lonicera japonica* (Japanese honeysuckle), *Lonicera morrowii* (Morrow's bush honeysuckle), *Lonicera tartarica* (Tartarian honeysuckle), *Lythrum salicaria* (Purple loosestrife), *Meliotus officinalis* (Yellow sweetclover), *Microstegium vimineum* (Japanese stiltgrass), *Myriophyllum spicatum* (Eurasian water-milfoil), *Phalaris arundinacea* (Reed canary grass), *Phragmites australis* (Common reed grass), *Polygonum cuspidatum* (Japanese knotweed), *Polygonum perfoliatum* (Mile-a-minute), *Potamogeton crispus* (Curly leaf pondweed), *Pueraria montana* (Kudzu), *Ranunculus ficaria* (Lesser celandine), *Rhamnus cathartica* (Common buckthorn), *Robinia pseudoacacia* (Black locust), *Rosa multiflora* (Multiflora rose), *Rubus phoeniocolasius* (Wineberry), *Typha latifloia* (Broad-leaved cattail), *Typha angustifolia* (Narrowed leaved cattail).

Section C: In addition to the information required in Section A above, all successful second full growing season monitoring reports must include the following information. If any one or more of the below listed parameters are not met then this full growing season monitoring period must be repeated until satisfied.

1. Documentation that the hydrologic regime specified in the approved mitigation proposal, which proves the mitigation site is a wetland continues to appear to be present.

2. Documentation that demonstrates that there is at least 60% areal coverage of the planted vegetation or target hydrophytes which are species native to the area and similar to ones identified on the mitigation planting plan.

3. Documentation that demonstrates less than 10 percent of the site is occupied by invasive or noxious species as listed above at B.5.

Section D: In addition to the information required in Section A above, all successful third and final full growing season monitoring reports must include the following information. If any one or more of the below listed parameters are not met then this full growing season monitoring period must be repeated until satisfied.

1. Documentation which demonstrates that the goals of the wetland mitigation project (including the required transition area) as stated in the approved wetlands mitigation proposal and the permit, has been satisfied. This documentation must include information concerning invasive/noxious plant species and the percent coverage of these species on the site.

2. Documentation which demonstrates that the proposed hydrologic regime as specified in the mitigation proposal, which proves the mitigation site is a wetland has been satisfied. The documentation shall include when appropriate monitoring well data, stream gauge data, photographs and field observation notes collected throughout the monitoring period.

3. Documentation that demonstrates that there is at least 85% areal coverage of the planted vegetation or target hydrophytes which are species native to the area and similar to ones identified on the mitigation planting plan.

4. A field wetland delineation of the wetlands mitigation project based on techniques specified in the Federal Manual for Identifying and Delineation Jurisdictional Wetlands (1989).

5. A plan showing the flagged wetland delineation referenced above for review and approval by the Program. The wetland line must include global positioning system data points.

Monitoring reports shall be submitted to:

New Jersey Department of Environmental Protection
Division of Land Use Regulation
Mail Code 501-02A, P.O. Box 420
Trenton, New Jersey 08625-0420
Attn: Susan Lockwood

Appendix F

Historic Aerials

1930 Aerial Photograph
Source: http://njstateatlas.com/1930/

0 500 1,000
Feet

1956 Aerial Photograph (NETR 1956).

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0 Meters 96

0 Feet 400

1963 Aerial Photograph (NETR 1963).

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1972 Aerial Photograph (NETR 1972).

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W
E
S

0 Meters 96

0 Feet 400

1986 Aerial Photograph (NETR 1986).

0 Meters 96

0 Feet 400

Appendix G

NJDEP Permit Authorization

(1500-10-0002.1)

STATE OF NEW JERSEY
DEPARTMENT OF ENVIRONMENTAL PROTECTION
DIVISION OF LAND USE REGULATION

Mail Code 501-02A, P.O. Box 420, Trenton, New Jersey 08625-0420

Telephone: (609) 777-0454 or Fax: (609) 777-3656
www.state.nj.us/dep/landuse

PERMIT

In accordance with the laws and regulations of the State of New Jersey, the Department of Environmental Protection hereby grants this permit to perform the activities described below. This permit is revocable with due cause and is subject to the limitations, terms and conditions listed below and on the attached pages. For the purpose of this document, "permit" means "approval, certification, registration, authorization, waiver, etc." Violation of any term, condition or limitation of this permit is a violation of the implementing rules and may subject the permittee to enforcement action.

Approval Date: OCT 26 2012

Expiration Date: OCT 26 2017

Permit Number(s)	Type of Approval(s)	Enabling Statute(s)
1500-10-0002.1, CAF120001 WFD120001 WFD120002 CSW120001 FWW120001	CAFRA Individual Permit Waterfront Development In-water and Upland Individual Permits Coastal Wetlands Permit Freshwater Wetlands Individual Permit Water Quality Certificate	NJSA 13:9B FWW NJSA 58:16A FHA NJSA 13:19 CAFRA NJSA 12:5-3 WFD NJSA 13:9A COAST WET NJSA 58:10A-1 POLLUTION NJSA 40:55D-93-99SWM

Permittee:

NJDOT
1035 Parkway Avenue
P.O. Box 600
Trenton, NJ 08625

Site Location:

Project: Route 72 Manahawkin Bay Bridges
Municipalities: Stafford & Ship Bottom
County: Ocean

Description of Authorized Activities

- This permit authorizes the expansion and improvement of the Route 72 bridges over Manahawkin Bay, between Stafford and Ship Bottom, Ocean County. Subject to the conditions contained here in the activities authorized are: The rehabilitation of the 4 existing Route 72 bridge segments, which are from west to east: Hilliard's Thorofare Bridge, Bay Bridge, West Thorofare Bridge, and East Thorofare Bridge.
- Construction of a new bridge parallel to the Bay Bridge, including the construction of 16 new piers
- Replacement of bulkheads and installation of scour countermeasures
- Reconfiguration of Route 72 including the Marsha Drive intersection in Stafford
- Construction of traffic and drainage improvements including a stormwater pump station in Ship Bottom
- Construction of two bio-retention basins and an extended detention wetland
- Construction of 6 public access parking lots
- Intelligent Transportation System improvements along Route 72 to the Garden State Parkway

This permit also includes a Coastal Wetlands Permit authorizing the permanent loss of 0.17 acres of coastal wetlands and the temporary impact to 0.27 acres of coastal wetlands, and a Freshwater Wetlands Individual Permit authorizing the permanent impact of 0.01 acres of emergent freshwater wetlands and 0.04 acres of State open waters, and the temporary impact of 0.01 acres of freshwater wetlands and 3.05 acres of State open waters.

Prepared by:

Becky Mazzei — 10/26/12

Becky Mazzei — **Date**

Received and/or Recorded by County Clerk

THIS PERMIT IS NOT EFFECTIVE AND NO CONSTRUCTION APPROVED BY THIS PERMIT, OR OTHER REGULATED ACTIVITY, MAY BE UNDERTAKEN UNTILTHE APPLICANT HAS SATISIFIED ALL PRE-CONSTRUCTION CONDITIONS AS SET FORTH HEREIN.

This permit is not valid unless authorizing signature appears on the last page.

CONDITIONS APPLICABLE TO ALL LAND USE PERMITS:

1. In accordance with the applicable regulations, any person who is aggrieved by this decision or any of the conditions of this approval may request a hearing within 30 days after notice of the decision is published in the DEP Bulletin. This request must include a completed copy of the Administrative Hearing Request Checklist. The DEP Bulletin is available through the Department's website at http://www.nj.gov/dep/bulletin and the Checklist is available through Division's website at http://www.nj.gov/dep/landuse/forms/lurpaahr.pdf In addition to your hearing request, you may file a request with the Office of Dispute Resolution to engage in alternative dispute resolution. Please see the website www.nj.gov/dep/odr for more information about this process;

2. The permittee, its contractors and subcontractors shall comply with all conditions of this permit, supporting documents and approved drawings; and

   i. Plans and specification in the application and conditions imposed by this permit shall remain in full force and effect so long as the proposed development or any portion thereof is in existence, unless modified by the department in writing;

   ii. If this permit contains a condition that must be satisfied prior to the commencement of construction, the permittee must comply with such condition(s) within the time required by the permit or, if no time specific requirement is imposed, then within seven months of the effective date of the permit, or provide evidence satisfactory to the Department that such condition(s) cannot be satisfied; and

   iii. Any noncompliance with this permit constitutes a violation, and is grounds for enforcement action, as well as suspension and/or termination of the permit; This approval does not in any way affect the right of the State to seek and collect monetary penalties or to take other enforcement action, should it be determined that a violation has occurred onsite;

3. It shall not be a defense for this permittee in an enforcement action that it would have been necessary to halt or reduce the permitted activity in order to maintain compliance with the conditions of the permit;

4. The permittee shall take all reasonable steps to prevent, minimize or correct any adverse impact on the environment resulting from activities conducted pursuant to the permit, or from noncompliance with the permit;

5. The issuance of this permit shall in no way expose the State of New Jersey or the Department to liability for the sufficiency or correctness of the design of any construction, structure or structures. Neither the State nor the Department shall, in any way, be liable for the loss of life or property which may occur by virtue of the activity of development resulting from any permit;

6. The permittee shall immediately inform the Department of any unanticipated adverse effects on the environment not described in the application or in the conditions of this permit. The Department may, upon discovery of such unanticipated adverse effects, and upon the failure of the permittee to submit a report thereon, notify the permittee of its intent to suspend the permit;

7. This permit can be modified, suspended or terminated for cause. The filing of a request to modify an issued permit by the permittee, or a notification of planned changes or anticipated noncompliance does not stay any condition of this permit;

8. This permit does not convey any property rights of any sort, or any exclusive privilege;

9. A copy of the permit and other authorizing documents including all approved plans and drawings shall be maintained at the authorized site at all times and made available to Department representatives or their designated agents immediately upon request.

i. The permittee shall also furnish to the Department within a reasonable time any information that the Department requests to determine compliance with this permit or to determine whether cause exists for suspension or termination of this permit; and

ii. The permittee shall also furnish to the Department, upon request, copies of records required to be kept by the permit;

10. The permittee shall allow an authorized representative of the Department, upon notification under current rule and upon the presentation of credentials, to:

i. Enter upon the permittee's premises where a regulated activity is located or conducted, or where records must be kept under the conditions of this permit;

ii. Have access to and copy, at reasonable times, any records that must be kept under the conditions of the permit;

iii. Inspect at reasonable times any facilities, equipment, practices or operations regulated or required under the permit. Failure to allow reasonable access under this section shall be considered a violation of this chapter and subject the permittee to enforcement action; and

iv. Sample or monitor at reasonable times for the purposes of assuring compliance with applicable rules;

11. No change in plans or specifications upon which this permit is issued shall be made except with the prior written permission of the Department;

12. The permittee shall provide reports to the Department as follows:

i. Monitoring results shall be reported at the intervals specified elsewhere in this permit;

ii. The permittee shall immediately report to the Department by telephone at (877) 927-6337 any noncompliance that may endanger health or the environment. In addition, the permittee shall report all noncompliance to Bureau of Coastal and Land Use Compliance and Enforcement, 401 E. State Street, 4th Floor, P.O. Box 422, Mail Code: 401-04C, Trenton, NJ 08625, in writing within five business days of the time the permittee becomes aware of the noncompliance. The written notice shall include: a description of the noncompliance and its cause; the period of noncompliance, including exact dates and times, and, if the noncompliance has not been corrected, the anticipated length of time it is expected to continue; and steps taken or planned to reduce, eliminate and prevent recurrence of the noncompliance. Such notice shall not, however, serve as a defense to enforcement action if the project is found to be in violation of this chapter;

iii. Where the permittee becomes aware that it failed to submit any relevant facts in an application, or submitted incorrect information in an application or in any report to the Department, it shall promptly submit such facts or information;

13. Development which requires soil disturbance, the creation of drainage structures, or changes in natural contours shall conduct operations in accordance with the latest revised version of "Standards for Soil Erosion Sediment Control in New Jersey," promulgated by the New Jersey State Soil Conservation Committee, pursuant to the Soil Erosion and Sediment Control Act of 1975, N.J.S.A. 4:24-42 et seq. and N.J.A.C. 2:90-1.3 through 1.14. and must obtain any required approvals from the local Soil Conservation District;

14. If any condition or this permit is determined to be legally unenforceable, modifications and additional conditions may be imposed by the Department as necessary to protect the public interest;

15. This permit is not transferable to any person unless the transfer is approved by the Department;

16. The permittee must obtain any and all other Federal, State and/or local approvals. Authorization to undertake a regulated activity under these rules does not indicate that the activity also meets the requirements of any

other rule, plan or ordinance. It is the applicant's responsibility to obtain all necessary approvals for a proposed project;

17. While the regulated activities are being undertaken, neither the permittee nor its agents shall cause or permit any unreasonable interference with the free flow of a regulated feature by placing or dumping any materials, equipment, debris or structures within or adjacent to the regulated area. Upon completion or abandonment of the work, the permittee and/or its agents shall remove and dispose of in a lawful manner all excess materials, debris, equipment, silt fences and other temporary soil erosion and sediment control devices from all regulated areas. Only clean non-toxic fill shall be used where necessary;

18. All excavated material and dredge material shall be disposed of in a lawful manner. (For example, it shall be placed outside of any flood hazard area, riparian zone, regulated water, freshwater/coastal wetlands and adjacent transition area, and in such a way as to not interfere with the positive drainage of the receiving area);

19. This permit or Verification shall be recorded in its entirety in the office of the County Clerk or the Registrar of Deeds and Mortgages for each county where this project is located. Verified notice of this action shall be forwarded to the Department immediately thereafter.

CONDITIONS APPLICABLE TO SPECIFIC PROJECT:

20. All necessary local, Federal, and other state approvals must be obtained by the applicant prior to the commencement of the herein-permitted activities. Approvals from the following agencies may be required:
    a. U.S. Army Corps of Engineers
    b. U.S. Coast Guard
    c. NJDEP Bureau of Tidelands

21. The NJDEP Bureau of Marine Water Monitoring shall be notified of the start of in-water construction *each year, 45 days prior to its commencement*, so that they can assess the need for shellfish bed closures. (BMWM, P.O. Box 405, Leeds Point, NJ 08220)

22. Vegetation within **50 feet** of the top of bank of Manahawkin Bay, and within **300 feet** of its Category 1 tributaries, shall only be disturbed in the areas specifically shown on the approved drawings No other riparian zone vegetation shall be disturbed for any reason. This condition applies to all channels onsite regardless of the contributory drainage area.

23. All temporarily disturbed areas of the Manahawkin Bay channel shall be restored to pre-construction conditions. Characteristics that shall be replicated include channel shape, width and meandering, ratio of shallow areas to deep areas, anticipated flow rate and velocity, and substrate type. Additionally, the channel bottom shall be restored to pre-construction elevations to ensure there is no loss of intertidal/subtidal shallows.

24. No raw concrete shall come in contact with the water. All geotextile mattresses and grout conveyances shall be tightly sealed to prevent leakage of grout/concrete. Any grout/concrete that comes in contact with the water must be removed immediately. No pumped water from grout/concrete operations may be discharged directly to the waterway. All pumped water shall be discharged to a holding tank and disposed of properly.

25. No hot work, debris, or construction material may enter any waterway as part of this project. This includes sandblasting material, paint, or epoxy and any concrete work by-products. If welding or burning is to take place, a layer of flame-proof material shall be the uppermost protective containment material.

26. Prior to any site preparation, the permittee shall submit to this Division for review and approval a Conservation/Restriction easement for the Public Access Areas authorized by this permit. Upon written approval from this Division, the permittee shall record this with the Ocean County Clerk (the Registrar of Deeds and Mortgages). Said Restriction shall run with and be binding upon all successive owners. **No fees shall be charged to the public for use of the public access areas authorized by this permit.**

27. Any monuments or survey disks which are disturbed during this project shall not be reset, but shall be returned to the NJ Geological Survey at NJDEP Geological and Water Survey, P. O. Box 420, Mail Code: 29-01, Trenton, NJ 08625-0420, (609) 292-1185.

28. The use of Green Acres encumbered parkland, even temporarily, requires prior Green Acres approval at a minimum. Therefore, should plans change to include any usage (even temporary) of the above listed parcels, the permittee shall contact Green Acres immediately at (609) 984–0500.

29. This permit to conduct a regulated activity in a wetland or open water includes the Division's approval of a Water Quality Certificate for these activities.

T&E Conditions

30. The existing Route 72 Bridges over Manahawkin Bay may provide nesting habitat for the State endangered Peregrine Falcon (*Falco peregrinus*). The permittee shall conduct a pre-construction survey for Peregrine Falcons within the project footprint (i.e., "Route 72 Manahawkin Bay Bridges"). This survey shall be conducted in consultation with the NJDEP Division of Fish and Wildlife Endangered and Nongame Species Program (NJDEP-ENSP) and shall be performed by a qualified biologist. The surveys shall be conducted in the spring of 2013 and consist of: one within mid-to-late March; the second the first two weeks of April, during peak nesting season, and the third one in early May. During each survey, observations should record peregrines in courtship displays, displaying territorial behavior, presence of eggs and/or chicks, etc. In the event that the surveys identify the presence of Peregrine Falcons nesting on any of the bridge structures, the permittee shall develop a plan in consultation with the NJDEP-ENSP to avoid impacts to the species in accordance with the State of New Jersey's Endangered and Nongame Species Conservation Act (N.J.S.A. 23:2A-1) and the Federal Migratory Bird Treaty Act (16 USC 703–712).

31. To minimize impacts to threatened and endangered wading bird species habitat (e.g., black-crowned and yellow-crowned night heron), the permittee shall plant a row of red cedar trees or something comparable along the entire marsh-side length of the parking lot depicted on sheet PP1-10. The plantings will serve as a living screen between human activities within the parking lot and suitable foraging habitat within the marsh, and will achieve compliance with N.J.A.C. 7:7E-3.38.

Seasonal Timing Restriction

32. To protect *winter flounder, river herring, anadromous fisheries, and SAV habitat* within Manahawkin Bay, a timing restriction on in-water construction activities shall apply from **January 1 to June 30** of each year. If coffer dams are constructed prior to the timing restriction, construction within the cofferdams may proceed during the timing restriction. Dewatering of cofferdams must include properly sized temporary sediment basins or other filtering methods to reduce turbidity. The water areas receiving return water discharged from cofferdams must be encompassed by a turbidity barrier. The turbidity barrier must be located parallel to the open water channel and anchored to the shoreline or other fixed feature to maintain free tidal flow.

Air Quality Conditions

33. The permittee shall ensure that all on-road vehicles and non-road construction equipment operated at, or visiting, the project site comply with the 3 minute idling limit, pursuant to N.J.A.C. 7:27-14 and 15.

34. The permittee shall ensure that all diesel non-road construction equipment used during the construction of the project use ultra-low sulfur fuel (<15 ppm sulfur) in accordance with the federal Nonroad Diesel Rule, 40 CFR Parts 9, 69, 80, 86, 89, 94, 1039, 1051, 1065, 1068.

35. The permittee shall ensure that all diesel non-road construction equipment greater than 100 horsepower used during the construction of the project has: engines that meet the USEPA Tier 4 non-road emission standards; or an engine that meets USEPA Tier 2 non-road emission standards plus the best available emission control that is technologically feasible for that application and verified by the USEPA or the California Air Resources Board (CARB) to reduce particulate matter emissions, subject to a. through c. below. A list of verified

emission control technologies can be found at http://epa.gov/cleandiesel/verification/verif-list.htm for USEPA and at http://www.arb.ca.gov/diesel/verdev/verdev.htm.

a. In the absence of a technologically feasible and appropriate control technology verified by USEPA or CARB for a particular diesel non-road construction equipment, the Division may allow the contractor to use the best available emission control technology verified by the Mine Safety and Health Administration and/or the Switzerland BUWAL program VERT Filter List to reduce particulate matter emissions http://www.vert-dpf.eu/

b. If the contractor demonstrates to the Division's satisfaction that it is not feasible to use any control technology, or installation of a control technology would create a safety hazard, including impaired visibility for the operator, the Division may grant a waiver from this condition. The waiver can also be granted if problems arise with the control technology during the construction project.

c. Diesel non-road construction equipment onsite for ten working days or less over the life of the project is not required to comply with this condition.

36. The permittee shall send bi-annual reports to NJDEP, Bureau of Mobile Sources, PO Box 420, Mail Code 401-02E, Trenton, N.J. 08625-0420. The bi-annual reports shall include summaries of the vehicles/equipment retrofitted, the types of retrofit devices used, any problems encountered with installation or operation of the devices, estimate of emissions reduced, and results of field audits or testing done to ensure compliance with these diesel emission reduction requirements. The reporting shall be done using forms on www.stopthesoot.org.

Submerged Aquatic Vegetation and Shellfisheries Conditions

37. SAV plants within areas where permanent impacts are proposed, shall be transplanted to the maximum extent practicable, to a designated mitigation area in accordance with a schedule to be determined within the final SAV mitigation plan.

38. All Turbidity barriers shall be installed prior to any in-water work being performed between **July 1** and **December 31** of each year and maintained for the duration of construction activities.

39. Silt fencing and/or floating turbidity barriers must be installed prior to and be maintained for the duration of any dewatering discharging effluent into Manahawkin Bay.

40. Work must be performed within existing and proposed rights-of-way and/or temporary construction easements as shown on the approved plans. Barges and other construction equipment used for construction purposes may not be staged or anchored in water areas outside of these boundaries.

41. Within one-year prior to rehabilitation work on the three trestle bridges, the applicant must perform a submerged aquatic vegetation (SAV) survey of the water areas under the bridges and the areas immediately adjacent to the bridges including any proposed construction easement areas shown on the approved plans. The permittee shall conduct the survey based upon the submitted document entitled "Pre-Construction Sampling Plan: 8/29/12 Submerged Aquatic Vegetation", but the permittee shall modify this plan to include transects under the existing trestle bridges. These areas shall also be monitored post-construction for the presence of SAV. A copy of this survey shall be provided to the Division of Land Use Regulation prior to construction.

42. A final SAV mitigation plan shall be provided to the Department for review and approval. In-kind mitigation for **2.12 acres** of permanent impacts to SAV habitat shall be provided at a 3:1 planting ratio. A combination of Zostera marina (eelgrass) and Ruppia maritima (widgeon grass) shall be planted. The applicant shall develop this mitigation plan in coordination the NJDEP Bureau of Shellfisheries (contact Ms. Kira Dacanay) and the National Marine Fisheries Service during the preparation phase of this plan. The plan shall provide details including, but not limited to, ratios of the species planted, monitoring and success criteria for planted SAV, monitoring and success criteria for areas of potentially permanent SAV impacts, areas proposed for planting, source SAV beds, and proposed monitoring reference sites. The plantings shall be monitored and replanted

annually for a minimum of three years to ensure a no net loss. Additional monitoring and replanting may be necessary to achieve a no net loss performance standard. A copy of this survey shall be provided to the Division of Land Use Regulation within 30 days of completion of the survey activity.

43. Water areas shall be monitored for permanent impacts (resulting from temporary activities) immediately following project construction and shall continue yearly for two years. If vegetation and/or habitat has been adversely affected by the construction activities and/or shading, and fails to reestablish within that two-year time period, the applicant shall provide compensatory planting and monitoring in accordance with the approved SAV mitigation plan.

44. In the event that monitoring identifies additional permanent impacts to SAV resulting from construction or shading a supplemental SAV mitigation plan shall be provided to the Department for review and approval within 90 days of completion of post construction monitoring activities conducted in accordance with the above permit condition. This plan shall provide details that demonstrate compliance with the two previous permit conditions. The applicant shall develop this mitigation in coordination the NJDEP Bureau of Shellfisheries (contact Ms. Kira Dacanay) and the National Marine Fisheries Service during the preparation phase of this plan. The plan shall provide details including, but not limited to, ratios of the species planted, monitoring and success criteria for planted SAV, monitoring and success criteria for areas of potentially permanent SAV impacts, areas proposed for planting, source SAV beds, and proposed monitoring reference sites.

45. *Prior to mitigation plantings* in accordance with an approved mitigation plan, the applicant must obtain a Scientific Collecting Permit from the New Jersey Division of Fish and Wildlife.

46. The applicant shall provide monetary compensation for the permanent impacts to **1.06 acres** of shellfish habitat. The contribution will be placed in an account earmarked for a specific shellfish restoration project in Barnegat Bay. The details of the project are to be designed and agreed upon between the New Jersey Department of Environmental Protection, the National Marine Fisheries Administration, and U.S. Army Corps of Engineers. Using a modified version of the recreational docks and piers formula

Shellfish Monetary Contribution Formula

$ = A*100*density*0.25

Where:
A = impact area (46,350 sq. ft.)
100 = life expectancy of bridge (years)
Density = 0.35 for moderate density of clams
0.25 = price per clam

$ = (46,350)(100)(0.35)(0.25) = $405,562

with 46,350 square feet (1.06 acres) of permanent impact to moderate density shellfish habitat, the monetary contribution equals **$ 405,562.**

WETLANDS, INTERTIDAL SUBTIDALSHALLOWS & STATE OPEN WATER MITIGATION CONDITIONS

47. The permittee shall mitigate for the **permanent** loss of 1.98 acres of intertidal and subtidal shallows through a mitigation project on Cedar Bonnet Island. Within 90 days of the date of this permit, the permittee shall submit a final design of the mitigation project to the Division of Land Use Regulation for review and approval and include all of the applicable items listed on the checklist entitled **Checklist for Completeness: Creation, Restoration or Enhancement for a Freshwater Wetland Mitigation Proposal located at** http://www.nj.gov/dep/landuse/forms/index.html

48. The permittee shall submit an application for all applicable permits required by the Department for the construction of the Cedar Bonnet Island Mitigation Project, which may include a Coastal General Permit No. 29 (N.J.A.C. 7:7-7.29) and a Freshwater Wetlands Statewide General Permit No. 16 (N.J.A.C. 7:7A-5.16).

49. The permittee shall mitigate for the **permanent** loss of 0.17acres of coastal wetlands, 0.01 acres of freshwater wetlands and 0.04 acres of state open waters through the Creation and Enhancement of 0.99 acres of coastal wetlands located within the project right-of-way. Within 90 days of the date of this permit, the permittee shall submit a final design of the mitigation project to the Division of Land Use Regulation for review and approval in accordance with the requirements of N.J.A.C. 7:7E-3B and include all of the applicable items listed on the checklist entitled **Checklist for Completeness: Creation, Restoration or Enhancement for a Freshwater Wetland Mitigation Proposal located at http://www.nj.gov/dep/landuse/forms/index.html.** In-kind replacement of wetland buffer areas shall be provided to the maximum extent feasible.

50. The permittee shall submit a final design for the restoration of 0.27 acres of coastal wetlands, 0.01 acres of freshwater wetlands temporarily impacted by project activities for review and approval by the Department

51. The proposed on-site mitigation for permanent impacts shall be conducted in accordance with an implementation schedule to be submitted to the Department for approval within **90 days prior to the initiation of regulated activities authorized by this permit.**

52. If the permittee is considering conducting a creation, restoration or enhancement project, the following conditions shall apply:

    a. **Prior to the completion of the mitigation project**, the permittee shall complete, sign and file with the County Clerk (the Registrar of Deeds and Mortgages in some counties), a conservation restriction that meets the requirements of N.J.A.C. 7:7E-3.27(h)6 or provide equivalent protection through an alternative means that shall be approved by the Department.

    b. The permittee shall notify the Mitigation Unit at the Division of Land Use Regulation in writing **at least 30 days prior to the start of construction of the wetland mitigation project** to arrange an on-site pre-construction meeting among the permittee, the contractor, the consultant and the Division.

    c. To ensure the intent of the mitigation design and its predicted wetland hydrology is realized in the landscape, the mitigation designer shall be present on-site during all critical stages of mitigation construction and during the restoration of any temporarily impacted areas. Critical stages of construction include but are not limited to herbicide applications, earthmoving activities, planting, and inspections.

    d. The permittee shall be responsible for ensuring that best management practices are used throughout construction to control the spread and colonization of highly invasive plants. Specifically, all equipment, especially tracks and tires, must be thoroughly cleaned every time equipment or vehicles move from an area containing invasive plants or from off-site to the mitigation area. For information on the specific species that are considered to be invasive, please refer to the Invasive Plant Atlas at http://www.invasiveplantatlas.org/index.html.

    e. In the event that changes to the mitigation design are necessary to ensure success of the project as a result of on-site conditions, the mitigation designer shall immediately notify the Division in writing and submit an alternative plan which achieves the proposed wetland conditions. Any modifications to the plan that are reviewed and approved by the Division must be shown on a signed and sealed revised plan. The As-Built plans required as a part of the Construction Completion Report may serve as the signed and sealed revised plan required to be submitted as part of the construction modification process described above if time constraints warrant such action and have been approved by the Division in writing.

f. **Within 30 days of final grading of the mitigation site and prior to planting**, the permittee shall notify the Mitigation Unit at the Division of Land Use Regulation in writing to arrange a post-grading construction meeting among the permittee, contractor, consultant and the Division.

g. **Within 30 days following the final planting of the mitigation project**, the permittee shall submit a Construction Completion Report to the Division detailing as-built conditions (see below) and any changes to the approved mitigation plan that were made during construction (N.J.A.C. 7:7E-3B.5(b)). The Construction Completion Report shall contain, at a minimum, the following information:

   i. A completed Wetland Mitigation Project Completion of Construction Form. This form is located at http://www.nj.gov/dep/landuse/forms/index.html and certifies that the mitigation project has been constructed as designed and that the proposed area of wetland creation, restoration or enhancement has been accomplished;

   ii. As-Built plans which depict final grade elevations at one foot contours and include a table of the species and quantities of vegetation that were planted including any grasses that may have been used for soil stabilization purposes; and

   iii. Photos of the constructed wetland mitigation project with a photo location map as well as the GPS waypoints in NJ state plane coordinates NAD 1983.

i. **Within 30 days following final planting of the mitigation project**, the permittee shall post the mitigation area with permanent signs which identify the site as a wetland mitigation project and that all-terrain vehicle use, motorbike use, mowing, dumping, draining, cutting and/or removal of plant materials is prohibited and that violators shall be prosecuted and fined to the fullest extent under the law. The signs must also state the name of the permittee, a contact name and phone number, and the Department's permit number.

j. The permittee shall monitor the mitigation for 5 full growing seasons beginning the year after the mitigation project has been completed. The permittee shall submit monitoring reports to the Division of Land Use Regulation no later than December 31st of each full monitoring year (N.J.A.C. 7:7E-3B.5(b)). All monitoring reports must include the standard items identified in the checklists entitled Wetland Mitigation Monitoring Project Checklist and Tidal Wetland Mitigation Monitoring Checklist. The Wetland Mitigation Monitoring Project Checklist and Tidal Wetland Mitigation Monitoring Checklist are located at http://www.nj.gov/dep/landuse/forms/index.html. The permittee shall submit monitoring reports to the Division of Land Use Regulation, no later than December 31st of each full monitoring year.

k. Once the required monitoring period has expired and the permittee has submitted the final monitoring report, the Division will make the finding that the mitigation project is either a success or a failure. In accordance with N.J.A.C. 7:7E-3B.5(b)3, the mitigation project will be considered successful if the permittee demonstrates all of the following:

   i. That the goals of the wetland mitigation project, including acreage and the required transition area, as stated in the approved wetland mitigation proposal and the permit have been satisfied. The permittee shall submit a field wetland delineation of the wetland mitigation project based on the Federal Manual for Identifying and Delineating Jurisdictional Wetlands (1989) which shows the exact acreage of State open waters, emergent, scrub/shrub and/or forested wetlands in the mitigation area;

   ii. The site has an 85 percent survival and 85 percent area coverage of the mitigation plantings or target hydrophytes, which are species native to the area and similar to ones identified on the mitigation planting plan. All plant species in the mitigation area must be healthy and thriving and all trees must be at least five feet in height;

iii. The site is less than 10 percent coverage by invasive or noxious species.

iv. The site contains hydric soils or there is evidence of reduction occurring in the soil; and,

v. The proposed hydrologic regime as specified in the mitigation proposal has been satisfied.

l. The permittee is responsible for assuming all liability for any corrective work necessary to meet the success criteria established above (N.J.A.C. 7:7E-3B.5(d)9). The Division will notify the permittee in writing if the mitigation project is considered to be a failure. Within 30 days of notification, the permittee shall submit a revised mitigation plan to meet the success criteria identified above for Division review and approval. The financial surety, if required, will not be released by the Division until such time that the permittee satisfies the success criteria as stipulated above.

RIPARIAN ZONE COMPENSATION CONDITIONS

53. The permittee shall mitigate for the permanent loss of 1.51 acres of forested and 0.19 acres of grassed riparian zone vegetation at a ratio of 2:1 compensation through a mitigation project at Cedar Bonnet Island. Within 90 days of the date of this permit, the permittee shall submit a final design of the mitigation project to the Division of Land Use Regulation for review and approval. In addition, **at least 90 days prior to the initiation of regulated activities authorized by this permit**, the permittee shall submit a proposal to provide 1:1 compensation for the temporary impact to 0.20 acres of grassed riparian zone vegetation. The mitigation proposal shall be designed in accordance with the applicable standards at N.J.A.C. 7:13-10.2(t) and (u).

54. The proposed riparian compensation shall be conducted in accordance with an implementation schedule to be submitted to the Department for approval within **90 days prior to the initiation of regulated activities authorized by this permit.**

55. **Prior to the completion of the riparian zone compensation project,** the permittee shall either sign a Department approved conservation restriction to protect the permanent impact compensation area from future development that would remove the vegetation planted in accordance with N.J.A.C. 7:13-10.2(t)3 or provide equivalent protection through an alternative means that shall be approved by the Department.

56. **The permittee shall monitor the riparian project for at least 3** years beginning the year after the riparian zone compensation project has been completed (N.J.A.C. 7:13-10.2(u)5). **The permittee shall submit monitoring reports to the Division of Land Use Regulation, no later than December 31st of each full monitoring year.**

a. All monitoring reports except the final one must include documentation and field data demonstrating that that the goals of the riparian zone compensation project will be achieved as stated in the approved riparian zone compensation proposal and the permit requirements will be satisfied. If the permittee is finding problems with the compensation project and does not anticipate the site will be a full success, recommendations on how to rectify the problems shall be included in the report with a time frame in which they will be completed.

b. The final monitoring report must include documentation and data demonstrating the following:

i. That the goals of the riparian zone compensation project as stated in the approved riparian zone compensation proposal and the permit conditions have been satisfied.

ii. That at least 85 percent of the compensation plantings have survived and that at least 85 percent of the compensation area is established with native species similar to ones identified on the compensation planting plan. All plant species in the compensation area must be healthy and thriving. All trees must be at least 5 feet in height; and

iii. That the site is less than 10 percent occupied by invasive or noxious species.

57. If the riparian compensation project does not meet the success criteria established above the project shall be considered a failure and the permittee shall submit a revised riparian compensation plan. The revised plan shall be submitted within 60 days of receipt of notification from the Division indicating the riparian compensation project was a failure.

58. If the Division determines that the riparian zone compensation project is not constructed in conformance with the approved plan, the permittee will be notified in writing by the Department and will have 60 days to submit a proposal to indicate how the project will be corrected.

Stormwater Conditions

59. All excavated material and dredged spoils shall be disposed of in a lawful manner outside of any flood hazard area riparian zone, open water, freshwater wetland and adjacent transition area, and in such a way as to not interfere with the positive drainage of the receiving area unless specifically approved by the Department.

60. The permittee shall make specific arrangements to ensure the continuous maintenance and efficient operation of all proposed stormwater management measures onsite. This includes the inspection (and cleaning where necessary) of any and all constructed wetland extended detention basin, bio-retention basin, and inlets at least four times per year and after every major storm totaling 1 inch of rainfall or more, the use of appropriate soil conservation practices onsite, and any other reasonable effort required to maintain the stormwater management system in good working order.

61. The permittee shall ensure that the bioretention basin to be constructed near Morris Boulevard is constructed with a bottom surface elevation of 6 feet, as shown on the approved plan entitled "CONSTRUCTED STORMWATER WETLAND CROSS-SECTIONS, ROUTE 72 MANAHAWKIN BAY BRIDGES, CONTRACT NOS. 025113850, 026118012, 026118013 & 026118014", certified October 23, 2012 by Parsons Brinckerhoff, Inc. In addition, the permittee shall ensure that the bottom surface elevation of the forebay in the constructed stormwater wetland is at elevation 1.5 feet and that the bottom surface elevation of the wetland is at elevation -2.50 feet.

62. Any future expansion or alteration of the approved stormwater management system, which would affect water quality, increase the rate or volume of stormwater leaving the site, affect the infiltration capacity on the site, or alter the approved low impact site design, shall be reviewed and approved by the Department prior to construction. This includes any proposed changes to the discharge characteristics of any basin, the construction of new inlets or pipes that tie into the storm sewer network and/or the replacement of existing inlets or pipes with structures of different capacity.

63. Prior to the start of construction, the permittee shall submit for review and approval, a plan with associated design reports for the retrofit of existing stormwater basins that demonstrates that the project is nitrogen neutral and that the TSS removal requirements for the project will be satisfied in accordance with the NJ Stormwater Management rules (N.J.A.C. 7:8). The required level of treatment for TSS removal is the equivalent of 4.78 acres treated to 80% TSS removal. The basins to be included in the plan are, at a minimum, the following four basins: Basins #70-WB-51.25, 70-WB-57.73, 70-WB-57.19, and 195-EB-16.71. Should it be determined that these four basins do not satisfy the goal of nitrogen neutrality and 80% TSS removal, then additional retrofits shall be incorporated into the project as necessary. In the event that additional retrofits are determined to be necessary, then the permittee shall submit additional plans and reports for review and approval prior to the start of construction. Upon receiving Department approval of the aforementioned plan, the permittee shall initiate basin retrofit activities within 9 months. Once basin retrofit activities commence, the permittee shall have 1 year to complete these activities.

64. The drawings hereby approved are 73 plan sheets entitled:

"NEW JERSEY DEPARTMENT OF TRANSPORTATION, ROUTE 72 MANAHAWKIN BAY BRIDGES, CONTRACT NOS. 025113850, 026118012, 026118013 & 026118014," consisting of 195 sheets dated April 3 2012 prepared by PARSONS BRINCKERHOFF, INC. revised as noted, signed and certified on October 23, 2012, and prepared by PARSONS BRINCKERHOFF, INC.

a. "TYPICAL SECTIONS," sheets TS-1 to TS-11, each sheet certified April 3, 2012,
b. "PERMIT PLANS SET #1," sheets PP1-1 to PP1-12, with sheets PP1-4, PP1-7, PP1-9, and PP1-10 last revised September 19, 2012, and sheets PP1-6, PP1-8, and PP1-11 last revised June 14, 2012,
c. "PERMIT PLANS SET #3, SHEETS PP3-1 TO PP3-12," last revised on September 20, 2012,
d. "PERMIT PLANS, SUBMERGED AQUATIC VEGETATION, SHEETS SAV-1 TO SAV-5 AND SAV-9 TO SAV-12," no revision date,
e. "PERMIT PLANS, SUBMERGED AQUATIC VEGETATION, SHEETS SAV-6 TO SAV-8," last revised on September 21,
f. "SHIP BOTTOM PERMIT PLANS," sheets SB-1 to SB-12, each sheet certified April 3, 2012,
g. "CONSTRUCTED STORMWATER WETLAND CROSS-SECTIONS", sheet unnumbered, undated, unrevised,
h. "CONSTRUCTION DETAILS," sheet DTL-2/DTL-1, undated and unrevised

"NEW JERSEY DEPARTMENT OF TRANSPORTATION, BUREAU OF STRUCTURAL ENGINEERING, ROUTE 72 MANAHAWKIN BAY BRIDGES, CONTRACT NO. 026118012"

a. "GENERAL PLAN AND ELEVATION -1", sheet 78 of 195, no certification date,
b. "GENERAL PLAN AND ELEVATION -2", sheet 79 of 195, no certification date,
c. "GENERAL PLAN AND ELEVATION -3", sheet 80 of 195, no certification date,
d. "ABUTMENT DETAILS", sheet 81 of 195, no certification date,

"NEW JERSEY DEPARTMENT OF TRANSPORTATION, BUREAU OF STRUCTURAL ENGINEERING, ROUTE 72 MANAHAWKIN BAY BRIDGES, CONTRACT NO. 026118014"

a. "GENERAL PLAN AND ELEVATION -1", sheet 82 of 195, no certification date,
b. "GENERAL PLAN AND ELEVATION -2", sheet 83 of 195, no certification date,
c. "GENERAL PLAN AND ELEVATION -3", sheet 84 of 195, no certification date,

"NEW JERSEY DEPARTMENT OF TRANSPORTATION, BUREAU OF STRUCTURAL ENGINEERING, ROUTE 72 MANAHAWKIN BAY BRIDGES, CONTRACT NO. 026118013"

a. "HILLIARDS THOROFARE GENERAL PLAN AND ELEVATION", sheet 85 of 195, no certification date,
b. "WEST THOROFARE GENERAL PLAN AND ELEVATION", sheet 86 of 195, no certification date,
c. "EAST THOROFARE GENERAL PLAN AND ELEVATION", sheet 87 of 195, no certification date,

"NEW JERSEY DEPARTMENT OF TRANSPORTATION, BUREAU OF STRUCTURAL ENGINEERING, ROUTE 72 MANAHAWKIN BAY BRIDGES, CONTRACT NO. 026118012"

a. "RETAINING WALL NO. 1", sheet 88 of 195, no certification date, and
b. "RETAINING WALL NO. 2", sheet 89 of 195 no certification date.

If you need clarification on any section of this permit or conditions, please contact our Technical Support Call Center at (609) 777-0454.

Christopher Jones, Manager
Bureau of Urban Growth & Redevelopment
Division of Land Use Regulation

10/26/12
Date

Original sent to Agent to record

C: Applicant
Municipal Construction Officials
USFWS c/o Steve Mars
U.S. Army Corps c/o Mike Hayduk
NMFS c/o Karen Greene
NJDEP Compliance & Enforcement, Toms River Office c/o Michele Kropilak
NJDEP Bureau of Shellfisheries c/o Kira Dacanay

Appendix H

U.S. Army Corps of Engineers Permit Authorization

(CENAP-OP-R-2012-328-35)

DEPARTMENT OF THE ARMY PERMIT

PERMITTEE AND PERMIT NUMBER:

New Jersey Department of Transportation
Route 72 Manahawkin
CENAP-OP-R-2012-328-35

ISSUING OFFICE:

Department of the Army
U.S. Army Corps of Engineers, Philadelphia District
Wanamaker Building - 100 Penn Square East
Philadelphia, Pennsylvania 19107-3390

NOTE: The term "you" and its derivatives, as used in this permit, means the permittee or any future transferee. The term "this office" refers to the appropriate district or division office of the Corps of Engineers having jurisdiction over the permitted activity or the appropriate official of that office acting under the authority of the commanding officer.

You are authorized to perform work in accordance with the terms and conditions specified below.

PROJECT DESCRIPTION:

Construction of a new parallel bridge adjacent to the existing Route 72 Manahawkin Bay Bridge, rehabilitation of the existing Bay Bridge, rehabilitation of three other trestle bridges over Hilliard's Thorofare, East Thorofare, and West Thorofare, rehabilitation of wetlands on the U.S. Fish and Wildlife Edwin B. Forsythe Wildlife Refuge Cedar Bonnet Unit, and construction of a new outfall associated with the Ship Bottom storm water reconstruction, located in Stafford Township and Ship Bottom Borough, Ocean County, New Jersey.

All work is to be completed in accordance with the approved plan(s).

PROJECT LOCATION:

Township of Stafford and Borough of Ship Bottom, Ocean County, New Jersey

PERMIT CONDITIONS:

General Conditions:

1. The time limit for completing the work authorized ends on December 31, 2020. If you find that you need more time to complete the authorized activity, submit your request for a time extension to this office for consideration at least one month before the above date is reached.

2. You must maintain the activity authorized by this permit in good condition and in conformance with the terms and conditions of this permit. You are not relieved of this requirement if you abandon the permitted activity, although you may make a good faith transfer to a third party in compliance with General Condition 4 below. Should you wish to cease to maintain the authorized activity or should you desire to abandon it without a good faith transfer, you must obtain a modification of this permit from this office, which may require restoration of the area.

3. If you discover any previously unknown historic or archeological remains while accomplishing the activity authorized by this permit, you must immediately notify this office of what you have found. We will initiate the Federal and State coordination required to determine if the remains warrant a recovery effort or if the site is eligible for listing in the National Register of Historic Places.

4. If you sell the property associated with this permit, you must obtain the signature of the new owner in the space provided and forward a copy of the permit to this office to validate the transfer of this authorization.

5. If a conditioned water quality certification has been issued for your project, you must comply with conditions specified in the certification as special conditions to this permit. For your convenience, a copy of the certification is attached if it contains such conditions.

6. You must allow representatives from this office to inspect the authorized activity at any time deemed necessary to ensure that it is being or has been accomplished in accordance with the terms and conditions of your permit.

Special Conditions:

1. All work performed in association with the above noted project shall be conducted in accordance with the project plans identified as "**Permit Plans Set #2, Route 72 Manahawkin Bay Bridges Contract NOs 025113850, 026118012, 026118013 and 026118014**", sheets PP2 - 1 through PP2-12, signed October 23, 2012, last revised September 7, 2012, prepared by Parsons Brinckerhoff, Inc.; **"Permit Plans Submerged Aquatic Vegetation, Route 72 Manahawkin Bay Bridges Contract NOs 025113850, 026118012, 026118013 and 026118014"**, sheets SAV-1 through SAV-12, signed October 23, 2012, unrevised, prepared by Parsons Brinckerhoff, Inc.; **"NJDEP Resources Compensation Plan, Route 72 Manahawkin Bay Bridges Contract NOs 025113850, 026118012, 026118013 and 026118014"**, one sheet, dated July 31, 2012, unrevised, prepared by Parsons Brinckerhoff, Inc.; **"BRIDGE PROFILE, Route 72 Manahawkin Bay Bridges Contract NO 026118014"**, one sheet, dated April 11, 2012, unrevised, prepared by Parsons Brinckerhoff, Inc.; **"Ship Bottom Permit Plans, Route 72 Manahawkin Bay Bridges Contract NOs 025113850, 026118012, 026118013 and 026118014",** sheets SB-1 and SB-2 of SB-12, dated July 31, 2012, unrevised, prepared by Parsons Brinckerhoff, Inc.; and **"US Army Corps of Engineers R.O.W. Mitigation Plan, Route 72 Manahawkin Bay Bridges Contract NOs 025113850, 026118012, 026118013 and 026118014"**, sheets ACE-1 and ACE-2, signed December 20, 2012, unrevised, prepared by Parsons Brinckerhoff, Inc. The project plans provide for the Construction of a new parallel bridge adjacent to the existing Route 72 Manahawkin Bay Bridge, rehabilitation of the existing Bay Bridge, rehabilitation of three other trestle bridges over Hilliard's Thorofare, East Thorofare, and West Thorofare, rehabilitation of wetlands on the U.S.

Fish and Wildlife Edwin B. Forsythe Wildlife Refuge Cedar Bonnet Unit, and construction of a new outfall associated with the Ship Bottom storm water reconstruction located in Stafford Township and Ship Bottom Borough, Ocean County, New Jersey. The purpose, as defined by FHWA in their NEPA EA, of the proposed project is to maintain the Route 72 Causeway bridges and approach roadways in order to provide continuous vehicular access to Long Beach Island communities and maintain suitable coastal evacuation egress and maritime passage in the Intracoastal Waterway.

2. Construction activities shall not result in the permanent disturbance or alteration of greater than 2.50 acres of waters of the United States. Of this total, permanent impacts to wetlands is approximately 0.18 acres and tidal open water comprise the remaining 2.32 acres of impacts. Of the 2.32 acres of impacts to water of the U.S., 1.48 acres shall remain waters of the U.S. and 0.84 acres would be permanently lost. Temporary impacts to wetlands is approximately 0.28 acres. Temporary impacts to waters is approximately 0.34 acres. All temporary impacts to wetlands shall be restored to pre-disturbance grades and seeded/planted within 90 days of completion of the authorized permanent work associated with the temporary impacts. Should you require additional time to complete the restoration work, you must notify this office 15 days prior to the restoration deadline and seek a modification to this permit. Construction activities on a portion of the U.S. Fish and Wildlife Service Edwin B Forsythe Refuge, Cedar Bonnet Island, to off-set impacts to State resources shall not result in the disturbance or alteration of 15.12 acres of degraded wetlands within a former confined disposal facility. Work on the Cedar Bonnet Island refuge involves the removal of 110,000 cubic yards of dredged material, installation of tidal channels into the restored wetland complex and the partial removal of existing berms around the island. The overburden material will be stored within the uplands on the refuge.

3. You may not perform regulated work until such time as the New Jersey Department of Environmental Protection (NJDEP) has issued a Section 401 Water Quality Certification and Coastal Zone Management consistency certification. Once the State has issued the required Section 401 WQC and CZM consistency certification, you should complete and sign the enclosed *Notification/ Certification of Work Commencement Form* (Enclosure 1) and submit it to this office at least 10 days prior to the commencement of authorized work. All notifications required by this condition shall be in writing and shall be transmitted to this office by registered mail. Oral notifications are not acceptable. This office shall also be notified within 10 days of the completion of the authorized work by completing and signing the enclosed *Notification/Certification of Work Completion/Compliance Form* (Enclosure 2).

4. Any deviation in construction methodology or project design from that shown on the above noted drawings must be approved by this office, in writing, prior to performance of the work. All modifications to the above noted project plans shall be approved, in writing, by this office. No work shall be performed prior to written approval of this office.

5. Representatives of the U.S. Army Corps of Engineers shall be permitted to inspect the project during construction and mitigation monitoring in order to collect any samples, to conduct any tests deemed necessary or to inspect work for permit compliance.

6. The permittee is responsible for ensuring that the contractor and/or workers executing the activity(s) authorized by this permit have knowledge of the terms and conditions of the authorization and that a copy of the permit document is at the project site throughout the period the work is underway.

7. The permittee understands and agrees that, if future operations by the United States require the removal, relocation, or other alteration, of the structure or work herein authorized, or if, in the opinion of the Secretary of the Army or his authorized representative, said structure or work shall cause unreasonable obstruction to the free navigation of the navigable waters, the permittee will be required, upon due notice from the Corps of Engineers, to remove, relocate, or alter the structural work or obstructions caused thereby, without expense to the United States. No claim shall be made against the United States on account of any such removal or alteration. (This special condition is applicable to Corps of Engineers permits that provide authorization under Section 10 of the Rivers and Harbors Act of 1899.)

8. Soil erosion and sedimentation controls shall be installed in accordance with the approved plans and requirements by the various county soil conservation districts prior to any earth moving activity and maintained for the duration of the disturbance until such time as the soils are stabilized. The permittee shall monitor all erosion and sediment controls daily and repair as needed to maintain compliance with the approved plans, conditions contained in this permit and any requirements of the various county soil conservation districts.

9. You shall perform the pre- and post- monitoring program outlined in the November 30, 2012 "USACE Section 404 SAV Mitigation Plan" for the areas identified within the Temporary Construction Easement as shown on the approved plans. Should it be determined, through the monitoring program, that submerged aquatic vegetation is adversely affected (as defined in the November 30, 2012 report) by the project, you shall implement the mitigation measures prescribed in the report.

10. You shall compensate for the unavoidable loss of 0.84 acres of Federally regulated waters of the U.S., specifically submerged aquatic vegetation habitat, through the implementation of the November 30, 2012 "USACE Section 404 SAV Mitigation Plan". Compensation for lost waters involves the planting of SAVs at a 3:1 ratio and monitoring.

11. You shall compensate for the unavoidable loss of 0.18 acres of Federally regulated wetlands by implementing the compensatory mitigation package you proposed as shown on the approved plan above and according to the November 30, 2012 "USACE Section 404 Wetland Mitigation Plan". The compensatory mitigation package provides for the creation and enhancement of 1.22 acres of tidal wetlands immediately adjacent to Route 72 and U.S. Fish and Wildlife Service Edwin B. Forsythe Refuge Cedar Bonnet Island Unit.

12. The 404 compensatory mitigation work shall be initiated prior to or concurrently with the authorized work in Waters of the United States. Furthermore, you shall complete all grading of the 404 mitigation site no later than 12 months from initiation of regulated work with planting occurring immediately following grading plan review and approval by this office. Should grading completion coincide with a period outside the growing season, planting shall occur no later than the beginning of the following growing season and be completed no later than June 30 of that year.

13. You shall complete and execute the (Enclosure 4) joint NJDEP/Corps conservation easement entitled "GRANT OF CONSERVATION RESTRICTION/EASEMENT (Non-Routine Mitigation Site/Mitigation Banks) for the mitigation sites prior to the start any regulated work. You shall record the signed conservation restriction/easement on NJDOT Right-of Way and As-

built plans and/or with the Ocean County Clerk or Recorder and provide evidence to this office within 30 days of the recordation.

14. In order to protect Winter Flounder (Pseudopleuronectes americanus), no in-water work shall occur between January 1st and May 31st of any given year. Work performed within cofferdams shall not constitute in-water work.

FURTHER INFORMATION:

1. Congressional Authorities: You have been authorized to undertake the activity described above pursuant to:

☒ Section 10 of the Rivers and Harbors Act of 1899 (33 U.S.C. 403).

☒ Section 404 of the Clean Water Act (33 U.S.C. 1344).

☐ Section 103 of the Marine Protection, Research and Sanctuaries Act.

2. Limits of this authorization.

a. This permit does not obviate the need to obtain other Federal, State, or local authorizations required by law.

b. This permit does not grant any property rights or exclusive privileges.

c. This permit does not authorize any injury to the property or rights of others.

d. This permit does not authorize interference with any existing or proposed Federal projects.

3. Limits of Federal Liability. In issuing this permit, the Federal Government does not assume any liability for the following:

a. Damages to the permitted project or uses thereof as a result of other permitted or unpermitted activities or from natural causes.

b. Damages to the permitted project or uses thereof as a result of current or future activities undertaken by or on behalf of the United States in the public interest.

c. Damages to persons, property, or to other permitted or unpermitted activities or structures caused by the activity authorized by this permit.

d. Design or construction deficiencies associated with the permitted work.

e. Damage claims associated with any future modification, suspension, or revocation of this permit.

4. Reliance on Applicant's Data. The determination of this office that issuance of this permit is not contrary to the public interest was made in reliance on the information you provided.

5. Reevaluation of Permit Decision. This office may reevaluate its decision on this permit at any time the circumstances warrant. Circumstances that could require a reevaluation include, but are not limited to, the following:

a. You fail to comply with the terms and conditions of this permit.

b. The information provided by you in support of your permit application proves to have been false, incomplete, or inaccurate (see 4 above).

c. Significant new information surfaces which this office did not consider in reaching the original public interest decision.

Such a reevaluation may result in a determination that it is appropriate to use the suspension, modification, and revocation procedures contained in 33 CFR 325.7 or enforcement procedures such as those contained in 33 CFR 326.4 and 326.5. The referenced enforcement procedures provide for the issuance of an administrative order requiring you to comply with the terms and conditions of your permit and for the initiation of legal action where appropriate. You will be required to pay for any corrective measures ordered by this office, and if you fail to comply with such directive, this office may in certain situations (such as those specified in 33 CFR 209.170) accomplish the corrective measures by contract or otherwise and bill you for the cost.

6. Extensions. General Condition 1 establishes a time limit for the completion of the activity authorized by this permit. Unless there are circumstances requiring either a prompt completion of the authorized activity or a reevaluation of the public interest decision, the Corps will normally give favorable consideration to a request for an extension of this time limit.

Your signature below, as permittee, indicates that you accept and agree to comply with the terms and conditions of this permit.

Bruce Hawkins
(PERMITTEE)

1/17/2013
(DATE)

This permit becomes effective when the Federal official, designated to act for the Secretary of the Army, has signed below.

(District Engineer) (DATE)
Frank J. Cianfrani, Chief, Regulatory Branch

for John C. Becking, P.E.
Lieutenant Colonel, U.S. Army
District Commander

When the structures or work authorized by this permit are still in existence at the time the property is transferred, the terms and conditions of this permit will continue to be binding on the new owner(s) of the property. To validate the transfer of this permit and the associated liabilities associated with compliance with its terms and conditions, have the transferee sign and date below.

(TRANSFEREE) (DATE)